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EDITORIAL.

Dairy Farming in Malaya.

The policy in many countries to-day is to encourage local production instead of relying on imports of staple commodities. This policy is largely dictated by the present international currency difficulties and the tariff barriers erected by the Governments of most countries. Whereas, in the past, nations have relied on a favourable trade balance, such a view has been partly superseded by local production for internal consumption with the object of rendering the country more self-supporting at least in the provision of foodstuffs.

The widespread new policy finds its advocates and opponents amongst the economists, but without entering into the discussion of such a controversial subject, we desire briefly to state the position in Malaya in relation to dairy farming. Normally, the value of the net imports of milk and butter into Malaya exceeds $10,000,000 annually. With the lower values of our important export products, any diminution of this large bill for imported dairy products is desirable.

We would remark, however, that the experimental work of the Department of Agriculture into dairy-farming problems was inaugurated some eight years ago, at a time when local production to replace imports was less the accepted principle than it appears to be to-day. While even at that time, local production was held to be a virtue in itself, there were other and more convincing reasons which rendered desirable the improvement of dairy farming in Malaya.

In the first place, there existed a considerable, though very scattered, dairy industry throughout the country, and Indian-owned herds of cattle still exist near almost every centre of population. The produce was sold almost entirely to Asiatics.

Secondly, the stock from which this milk was obtained was generally inferior. It was therefore desirable that investigations should be put in hand with the object ultimately of improving the yield and quality of the milk. These investigations have necessitated consideration of such problems as breeding and cross-breeding suitable animals and feeding.

Thirdly,—and perhaps most important—the investigation of this subject has as its object the desirability of marketing fresh, pure and rich milk. The great advantage of the imported milk is its purity. This fact was the reason

for justified reluctance of the public to purchase locally-produced milk which might possibly be obtained from unhealthy stock kept under unhygienic conditions. Unless locally-produced milk can be guaranteed rich and pure, the public are well advised to continue to consume the imported product. On the other hand, if milk of guaranteed purity can be produced in Malaya, experience shows that it will be in demand.

The work at Serdang, which is described in this number, demonstrates that very real progress has been made. We are able to market a rich milk of guaranteed purity, and to maintain the supply throughout the year. The investigations are, of course, still in progress and it must be some years before anything approaching finality with regard to the most desirable type of animal can be claimed. Breeding trials, in particular, are incapable of early conclusion. The results to date, however, are extremely encouraging and we appear to be advancing to a stage where the up-grading of local stock can be taken in hand with confidence.

Controlled Drainage and Irrigation.

With the object of adding considerably to the acreage available for padi planting in Malaya, the Department of Drainage and Irrigation is carrying out work on schemes to provide several areas with a controlled water supply either by means of irrigation or by systems of controlled drainage. Among the most important of these areas is that in the mukim of Panchang Bedina in the Sub-District of Sabak Bernam, Selangor, where a system of controlled drainage is under construction which will render 15,000 acres of land available for padi cultivation.

In an interesting article in this number Mr. Miller, Drainage and Irrigation Engineer, Telok Anson, gives an account of the engineering work in progress.

In connexion with this article, we take the opportunity of adding some particulars of the agricultural side of the work.

As soon as it became known that work on the drainage scheme was about to be commenced, a number of applications for land in the area affected were received. Most of the land first taken up was situated on either side of the main drainage channel, but the demand for land soon outstripped the rate of progress of the work. Consequently, the blocks on which jungle was felled with a view to planting padi were scattered, resulting in difficulties of pest control.

Felling, burning and clearing were carried on under difficulties, since the land was wet and the numerous clumps of nibong palm offered serious obstacles to clearing. These difficulties are clearly shown in Mr. Miller's article.

To meet the demand for seed padi, the Department of Agriculture imported from Krian and other parts of the Peninsula some 10,000 gantangs of which 4,000 gantangs were seed of suitable pure strains and the remainder seed of mixed padi.

At the same time, the Department selected, felled, burned and cleared sites for two Padi Test Plots, one of about 6 acres on the main canal and another of about 4 acres at Sungei Haji Durani further inside the area.

These plots and much of the felled area were successfully planted in the latter half of 1932, but difficulties arising from damage to nurseries by rats had to be overcome.

Subsequently, rats appeared in large numbers and wrought havoc among the standing crop which was also attacked by stem borers. The prevalence of jungle stumps, especially nibong, and unburnt tree trunks on the land render measures for the control of rats very difficult, since they afforded excellent shelter for the pest. As a result, the initial crop obtained from this area was very small.

During the year 1933 further areas of jungle were felled and the work of clearing the land planted in the previous season was continued. The result has been that some 5,500 acres were planted with padi for the season 1933-34. After a somewhat late start, due to drought, growth was good. Rats appeared suddenly in large numbers early in 1934, but vigorous control measures were carried out successfully under the supervision of the administrative and agricultural officers. The crop now being reaped bids fair to give fairly satisfactory returns.

In addition to establishing the two Padi Test Plots, the Department of Agriculture has stationed a Malay Agricultural Subordinate in the Sub-District to give advice on padi work, and the appointment of a second officer is contemplated. The plots will serve to determine which pure strains of padi are best suited to local conditions and to demonstrate their value, and it is hoped to ensure that the area will soon be planted throughout with two or three pure strains giving good yields of grain of uniform size and ripening evenly over the whole area. Even ripening reduces damage by pests, especially birds, and uniformity of grain is an important factor in the production of rice of good quality when the padi is milled.

The probable future need for milling facilities in this extensive and somewhat remote area has not been overlooked. Attention has already been given to the selection of a suitable type of mill and steps have been taken to provide funds for its estimated cost.

The development of this large area of padi land will prove a valuable permanent addition to the cultivated land of this country and will be an important local source of production of rice.

THE GOVERNMENT DAIRY FARM, SERDANG

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Introductory.

The Government Stock Farm at Serdang is a branch of the Central Experiment Station, Serdang and is administered by the Officers in charge of the Station. It was commenced in 1926, principally with the object of carrying out research on methods of improvement of milch cattle of Malaya, but also of providing a supply of high-grade milk to Government Hospitals and to the general public.

The present article describes some of the problems connected with such a project, the various investigations now in progress, and the results so far obtained.

There is no indigenous domesticated breed of cattle in Malaya, the stock at present in the country consisting mostly of direct importations of cattle for draught and beef purposes, or the progeny of such animals.

The Indian dairymen, in or near the towns in Malaya, have made a few sporadic importations of milch cattle of various Northern Indian breeds, which are reputed to be better milk yielders than some of the Southern Indian breeds. In addition, a few Australian grade cattle of European breeds have been imported at various times by them; generally speaking, however, the introductions have been of the wrong type for dairy purposes and, in consequence, the milk yield of Malayan cows is exceptionally low.

In fact, the methods of animal husbandry generally practised by the average Indian dairyman tend to cause the degeneration rather than the improvement of livestock and, apart from work in the Government Institutions, very little effort has been made to improve the local milch cow.

Breeding Policy.—The principal objects in establishing a stock farm at Serdang were briefly, as follows :—

(1) The maintenance of a herd of pure-bred Montgomery cattle, from which, by continuous selection and up-grading, an improved strain of animal could eventually be produced with a view to :—

- (*a*) the production of a supply of high-grade fresh milk for Government Hospitals and the general public,
- (*b*) the distribution of high-class bulls for stud purposes,
- (*c*) the production of draught animals from surplus bulls.

(2) The introduction of high-class Friesian bulls for cross-breeding with the Montgomery cows.

(3) The determination whether imported Friesian stock can be acclimatised on the plains in Malaya with a view to establishing a small herd of pure-bred animals to provide a supply of stud bulls for crossing purposes.

The Montgomery breed was selected for trial as being the most likely to meet local requirements, that is, the production of milk and draught animals. According to reports, this breed has, during recent times, been selected for milk production to a far greater extent than any other in India and has been used for many years as the foundation stock for cross-breeding experiments both by Military Farms and the workers of the Agricultural Research Stations in many parts of India, including the Stock Farm of the Imperial Department of India at Pusa. As a result, the cows are usually considered to be better milkers than those of any other Indian breed.

Sources of the Livestock.

A start was made in October, 1926, when a small herd of pure-bred Montgomery or Sahiwal cattle, comprising four cows, one two-year-old heifer, one two-year-old bull and one yearling bull, was introduced at Serdang. The original stock was introduced from the Indian Government Stock Farm at Pusa. In addition to the above, a pure-bred Montgomery bull introduced from Pusa in October, 1924 by the Department and loaned to the Central Mental Hospital, Tanjong Rambutan, was transferred to Serdang in July 1926, for use as stud bull.

In June, 1928, two Australian Ayrshire cows, with two calves at foot, were presented to the farm by H.H. the Sultan of Johore.

At the end of 1928, the herd was further augmented by the introduction of four pure-bred Montgomery incalf cows and one Montgomery bull from Pusa.

In October, 1929, two high-class pedigree Friesian bulls ("Refiner" and "Controller") were introduced from the Hong Kong Dairy Farm with a view to increasing the milking qualities of the herd.

In June, 1930, six pure-bred Friesian incalf heifers were introduced from Australia in order to test the suitability of pure-bred Friesian cows on the plains in Malaya.

At the beginning of 1932, a pure-bred Jersey bull, six Jersey-Montgomery cross-bred cows and one Indian cow were transferred from the Government Dairy Farm at Fraser's Hill, and at the end of that year the milking stock was further increased by the purchase locally of two Indian cows of mixed origin.

The herd has naturally increased as a result of breeding and, after allowing for the sale of a large number of young bulls for stud purposes, at the end of 1933 there were 51 head of cattle on the farm, as detailed in the following table :—

Breed.		Cows.	Heifers.	Bulls.	Bull Calves.
Montgomery	...	12	2	2	1
Friesian	...	3	3	2	—
Friesian ½ x Montgomery ½	...	1	6	—	5
Friesian ¾ x Montgomery ¼	...	—	1	—	—
Jersey Crossbreds	...	5	1	—	—
Indian (locally-bred)	...	3	2	—	—
Montgomery ½ x Indian ½	...	—	1	—	—
Fries. ½ x Jer. ¼ x Mont. ¼	...	—	1	—	—
Total	...	24	17	4	6

Situation and Climate.

The farm is situated at Serdang in the State of Selangor and is approximately 3° North of the equator. The climate is monotonously equable and shows little variation throughout the year in the mean minimum and mean maximum temperatures.

The mean minimum temperature recorded at Serdang is 72°F., whilst the mean maximum is 91°F.

The rainfall is fairly evenly distributed throughout the year, there being no pronounced long dry seasons, and the average total rainfall is about 93 inches per annum. On the average, there are 165 wet days during the year.

The continuous luxuriant growth of vegetation throughout the year, even during the driest months, is such that the preservation of fodder in the form of hay or silage is unnecessary.

Buildings and Water Supply.

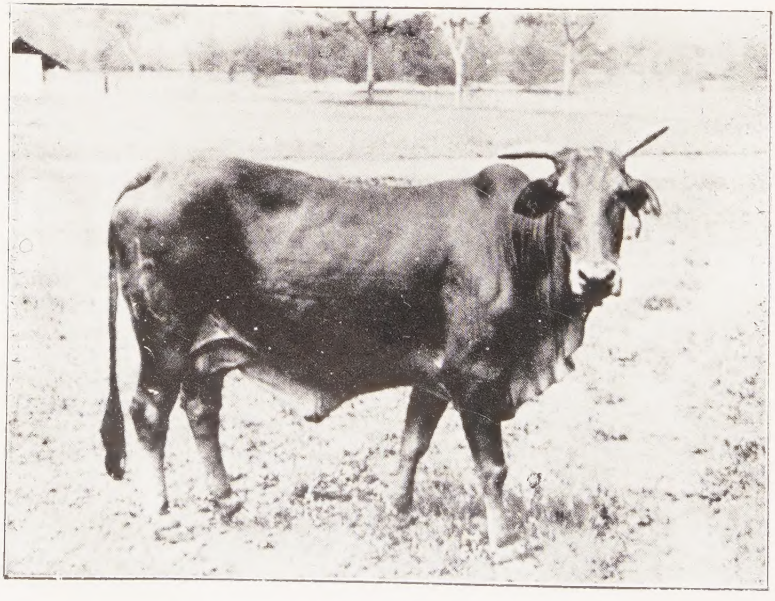
Buildings.—The farm buildings, which are mostly of the semi-permanent type, comprise the main cattle byre, one set of six calf and young stock boxes and one set of two bull boxes.

The main cattle byre is a building 75 feet long and 33 feet wide, constructed of wood and expanded metal, with roof of cement-asbestos sheets, the floors and feeding troughs being of cement-concrete, while stalls and

"Controller". Friesian Bull. Imported.

Friesian Cow. Imported.

Imported Montgomery Bull.



Imported Montgomery Cow. (dry).

stanchions of the modern steel type have been fitted. The feed room and milk room are situated at one end of the building, being separated by a passage to the byre.

The set of six calf and young stock boxes are contained in a similarly constructed building 51 feet long and 17 feet wide, with a 4-foot feeding passage at the back and a 4-foot open verandah on the front. Each box is fitted with two half doors, which open out on to the verandah.

The two bull boxes are contained in a permanent building 21 feet long and 20 feet wide, constructed of cement-concrete with cement asbestos roof. A feeding passage 4¼ feet wide is provided at the back and the double half doors open on to a 6½ foot verandah.

Water Supply.—In all the buildings there is a continuous supply of pure water for each animal on the central tank principle.

Rubber Flooring.—It may here be mentioned that in the byre an experiment is being made, in collaboration with the Rubber Research Institute of Malaya, to ascertain the suitability of rubber flooring for cattle standings. In March, 1933 the floors of three stalls were relaid with a cement-rubber composition devised by the Rubber Research Institute in the course of its rubber roadway trials. After several months wear the spreads showed no sign of ageing or deterioration in any of the stalls.

Pasturage.

An area of approximately 60 acres of land has been allotted to grazing paddocks and a further 20 acres to the cultivation of Guinea grass for green soiling. Roughly, 40 acres of the pasture land can be classed as poor and the balance of 20 acres, situated in a low-lying position, as almost infertile.

These lands were all provided with open drains, but later a portion of the low-lying area was underdrained with subsoil pipes. Although the cost of subsoil draining was high, the result is very satisfactory and the grass on this area has much improved since the operation was carried out.

Owing to previous cultivation of the 40 acres grazing field, situated on higher land, a stand of natural grasses, intermixed with various leguminous cover plants, took possession of the ground, which very soon provided excellent pasturage. The block was free of lalang grass (*Imperata arundinaceae*) in the first instance, but it was found, after only a few months, that it commenced to make its appearance and a regular patrol has since been necessary to effect control.

The cost of this is estimated at one cooly day monthly for every five acres. No relaxation of effort in this respect is possible, otherwise the lalang grass would obtain such a hold on the land that its eradication would later become very costly. It will be seen, therefore, that the cost of such a patrol is likely to be a steady drain in labour charges on stock farms in Malaya, if first class pasturage is to be maintained.

Experience has shewn that in laying down a pasture in Malaya it is advisable to establish a mixture of indigenous local grasses, such as cow grass (*Paspalum conjugatum*) and carpet grass (*Axonopus compressus*). Dallis grass (*Paspalum dilatatum*), an Australian grazing grass, has been planted with success in this country, but it is gradually replaced by the stronger-growing local grasses and it is quite impossible to keep it, or any other grass, as a pure stand for any length of time.

The policy recommended is to use fenced areas of limited acreage for combined grazing and exercise purposes and to permit the native low-growing grasses to take possession of the land; provided that lalang is kept under control, the stand of grass will consist principally of the indigenous *Axonopus compressus*, which is a good grazing grass.

It may be added that in order to prevent the breeding of flies and the fouling of the ground, it is important that cattle excrement on the grazing area should either be spread or removed at least once a week.

Fodders.

Fodder Grasses.—In view of the comparatively low feeding value of the pasturage, it is necessary, under Malayan conditions, to supplement grazing by stall-feeding with more highly nutritious grasses, such as Guinea grass (*Panicum maximum*), Merker grass (*Pennisetum merkeri*) or Napier grass (*P. purpureum*), all of which have been established at Serdang.

Of these three, Guinea grass is to be preferred and is the principal fodder crop grown on the farm.

Guinea Grass.—This fodder grass has been established on approximately 20 acres and is planted at a distance of 3 feet x 3 feet square. The grass is cut at intervals of about 3 weeks and when grown on land newly-opened from jungle has yielded over 40 tons of green grass per acre per annum. In order to maintain such a high yield, however, high cultivation, and heavy manuring is required.

Investigations designed to ascertain the yield of Guinea grass when cut at varying intervals from one to four weeks, and the amounts of plant nutrients removed from the soil thereby, showed that when moderate dressings of fertiliser were applied, yields at the rate of about 15 tons per acre per annum were obtained on previously cropped land. The most suitable interval of cutting was found to be there weeks (1), at which stage the grass is probably the most palatable.

It is probable that the best results will be obtained by replanting at intervals of 3 or 4 years.

The quantity of cut Guinea grass allowed to adult stock for stall-feeding is restricted to 40 lbs. per animal per diem, while young stock receive from 15 to 30 lbs. each per diem, according to age.

Merker Grass.—This is a tall, coarse, erect-growing grass, attaining a height of about 8 or 12 feet. It is easily propagated from portions of the mature stock and the usual planting distance is 5 feet x 5 feet square. The first cutting is taken six months from the date of planting and subsequent cuttings are made every four weeks. Under good conditions, approximately 60 tons of fresh fodder per acre per annum are obtained.

When cut in the young state it is an excellent fodder for all classes of cattle but, as the stems mature, the fodder becomes coarse and unpalatable, in which stage it is useless for feeding purposes.

Napier Grass.—This is a tall, coarse-growing, perennial grass, very similar to Merker grass, but having a more vigorous root system, it resists drought. Propagation is effected by short stem cuttings, which are planted 5 feet x 5 feet square.

As in the case of Merker grass, harvesting may commence at about six months from planting, subsequent cuttings being made at intervals of 4 to 6 weeks.

Leguminous Fodders.—The high protein, phosphoric acid and lime content of leguminous fodders profoundly influences the rate of growth of young animals and milk production of cows in temperate climates; consequently they are extensively fed in European countries. In striking contrast, little use is made of legumes in Malaya for stock feeding.

Numerous trials have been made with a number of legumes at Serdang, but with unsatisfactory results. On small experimental plots, on land of average fertility, yields of about 7 tons of green fodder per acre have been obtained with cow peas (*Vigna unguiculata*), while horse gram (*Dolichos biflorus*) has yielded over 8½ tons of green matter per acre.

Trials have also included Soya bean (*Glycine hispida*), Bengal gram (*Cicer arietinum*), and Black gram (*Phaseolus Mungo* var. *radiatus*), but the yields in all cases were very low.

Lucerne or alfalfa (*Medicago sativa*) has also been tried repeatedly at Serdang and on each occasion has proved a complete failure.

If satisfactory leguminous fodders could be found it would no doubt be advantageous, but their inclusion in stock rations in Malaya is probably of more importance in the case of imported European breeds than of native animals.

Rations for Stock.

Observations have shown that a ration of 40 lbs. of Guinea grass per day fed in the stalls, with grazing *ad libitum*, will fatten dry (pregnant) Indian Montgomery cows without the addition of any concentrates; on the other hand, dry Friesian cows require concentrates in addition. This is probably due to the greater power of digestion of Indian cows and also probably, in part, to the lower vitality of imported Friesian stock in the tropics.

Under these conditions, there appears to be no necessity for a maintenance diet for Indian cows other than grass, except for a few weeks prior to calving. Consequently, it is the practice on the farm to feed a production ration a little in excess of that required for the daily yield of milk in the case of the Indian cows, whilst the Friesian cows are given a full maintenance diet, along with a production ration having a slight excess of proteins in its composition.

These feeding methods induce the cows to secrete their maximum yield of milk. If, in feeding, it is noticed that individual cows put on flesh instead of yielding milk, the ration is reduced accordingly, since in such cases it is obvious that the ration is in excess of the needs for milk production.

The following particulars show the standard rations employed at Serdang for mature cows and calves :—

(*a*) *Mature Cows.*—

Animals of 800 lbs. live weight and yielding 1 gallon (10 lbs.) of milk per day are given 40 lbs. of Guinea grass per diem and allowed to graze in addition, while the ration of concentrates given to cows in milk is as follows :—

Rice bran	2 lbs.
Crushed Horse or Bengal gram ...	½ lb.
Coconut cake	1 lb.
Gingelly cake	2 lbs.

An allowance of 2½ lbs. of this mixture is given as a maintenance ration to all cows in milk and those which cannot maintain their condition on Guinea grass alone.

An extra 3 lbs. of the ration is added for each gallon of milk produced.

(*b*) *Calves.*—

The young calves are fed on whole milk until they are about one month old. Afterwards, they are given a reduced ration of milk, which is supplemented with half a pound of linseed cake per day.

From six months onwards they receive a mixture of the following concentrates :—

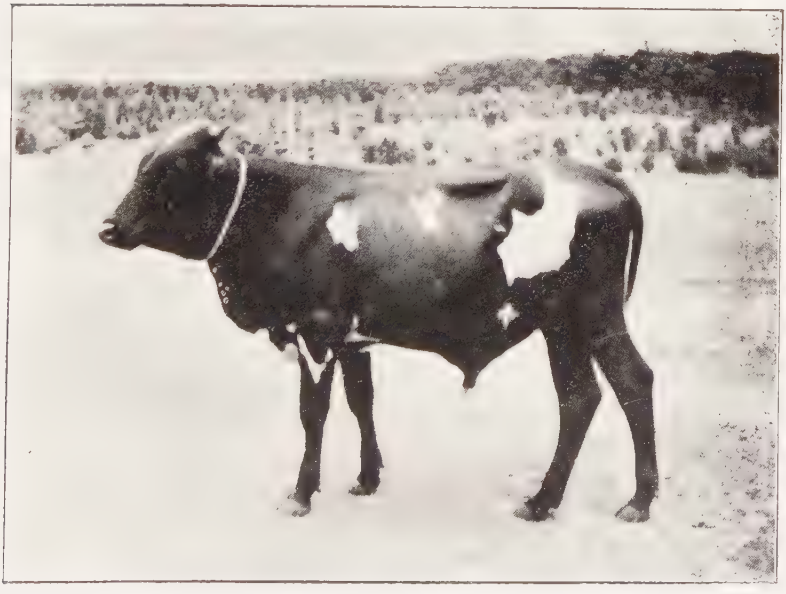
Rice bran	3 parts.
Crushed Horse or Bengal Gram ...	1 part.
Linseed cake	1 part.

This ration is fed at the rate of ½ to 2 lbs. per day, according to age, until the animals are two years' old. In addition, they are allowed Guinea grass *ad libitum*, which amounts to about 30 lbs. per day for the two-year-old animals.

Milking Routine.

Milking is carried out twice daily; at 4.30 a.m. and at 1.30 p.m. Every precaution is taken to ensure a clean supply of milk and immediately before milking, the byre is hosed down and the cows' udders are carefully washed with

Friesian × Montgomery Half-bred heifer.



Friesian × Montgomery Half-bred Bull Calf.

Malayan bred Montgomery Bull.

Jersey × Montgomery Half-bred Cow.

soap and water. The milkers are provided with clean white smocks, which they wear until the milking is finished and all the milk has been passed on to the adjoining milk room.

Hand-milking is practised at present, but it is hoped that later a trial will be made with milking machines.

The milk is weighed immediately it is drawn and the morning and evening yields of each cow are recorded on a standard type chart. After weighing, the milk is poured into a funnel and passes through the wall of the milk room, where it first flows through a filter of cotton wool and then over a milk cooler, through which a stream of cold water from a refrigerator is delivered. By this means, the temperature of the milk is reduced to about 60°F. Immediately after cooling, the milk is bottled in regulation pint and half-pint bottles, capped with paper discs, the latter being covered with a thin layer of paraffin wax, which is impressed with a special seal and is then ready for delivery.

After each milking, all dairy utensils and bottles are washed, first in cold water, then in hot water and afterwards steam sterilised.

Quality of the Milk.

Owing to the prevailing high air temperature and the resultant intense bacterial activity, great care is necessary to produce high-grade milk on the plains in this country and continuous supervision of the labourers is necessary to maintain the degree of cleanliness required.

Surprise sampling of the milk is carried out monthly by Inspectors of the Health Department and the samples are submitted to the Institute for Medical Research for bacteriological and chemical examination.

It has been found possible to keep the bacterial counts of samples well below the standard of "Certified Milk" (30,000 per c.c.).

Table I shows the results of the latest reports from the Health Officer, Inland Districts, Selangor.

The average butter fat content of the different breeds is in all cases well over the legal standard in the Federated Malay States of 3.25 per cent.

Particulars of yields of milk obtained from the different breeds of cattle in the herd are also given in Table II. Although the farm has only been established for a comparatively short period and therefore sufficient time has not yet elapsed to show the results of upgrading for milk production, the increased yield obtained from both imported Friesian, Indian and Cross-bred stock compared with locally-bred Indian cows is suggestive.

The suckling of the calves during the lactation period affects the yields of the Indian cows adversely as compared with pure-bred Friesian and Cross-bred Jersey-Montgomery cows, from which calves are removed at birth.

Table I

Bacteriological Examination of Milk Samples from the Government Dairy Farm, Serdang.

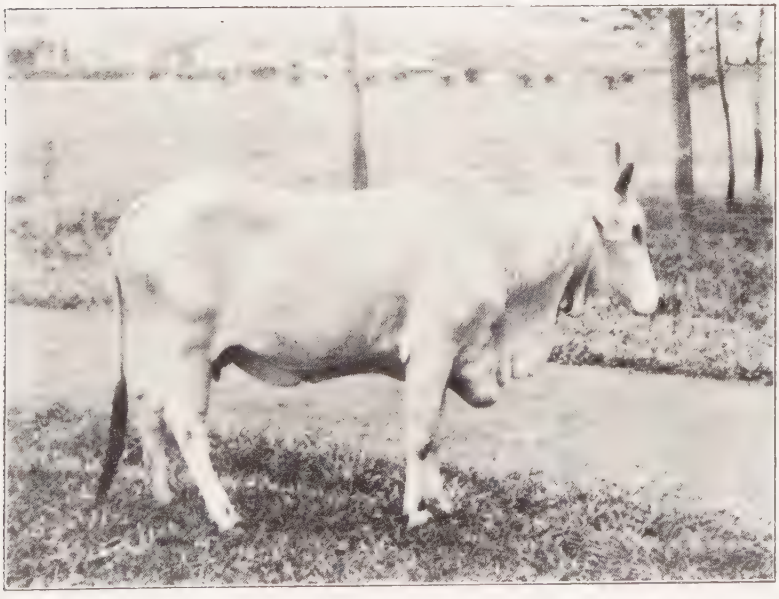
Date.	Sample.	No. of Organisms per c.c. developing on Agar at 37oC.		"B. Coli" absent from:	
		24 hrs.	48 hrs.	24 hrs.	48 hrs.
22-1-34	No. 1	2,500	3,500	1 c.c.	1 c.c.
	,, 2	1,600	2,000	1 c.c.	1 c.c.
27-2-34	,, 1	150	300	1 c.c.	1 c.c.
	,, 2	250	450	1 c.c.	1 c.c.
20-3-34	,, 1	350	400	1/10 c.c.	1/10 c.c.
	,, 2	300	350	1/10 c.c.	1/10 c.c.

Table II.

Particulars of the Yields, Lactation Period, and Average Butter Fat Tests of the Different Breeds of Cattle at Serdang.

	Milk Yield in pounds.	Lactation Period.	Average Butter Fat Test.	
	lbs.	Days.	a.m.	p.m.
Montgomery Cows:				
No. 22 ...	4,577	481	5.2	6.0
No. 2 ...	3,458	306	4.0	4.5
No. 3 ...	2,099	419	4.1	4.2
No. 4 ...	3,421	344	3.6	4.1
Friesian Cows:				
No. 37 ...	5,232	531	3.6	4.1
No. 42 ...	5,017	354	3.9	3.9
Jersey x Montgomery Crosses:				
No. 66 ...	4,700	360	4.2	4.4
No. 63 ...	4,420	210	4.0	4.2
Indian Cows (locally-bred):				
No. 55 ...	1,963	274	4.5	4.9
No. 56 ...	1,519	279	4.3	4.6

INDIAN COW. Local purchase.



INDIAN COW. Local purchase.

Normally a cow giving a yield of less than 3,500 lbs. (350 gallons) in a lactation period not exceeding 350 days would be discarded from the herd as a poor milker, but until the size of the herd is substantially increased, this policy cannot be adopted.

Grooming and Spraying the Livestock.

Most European breeds of cattle in the tropics appear to retain the cold climate characteristic of growing a heavy winter coat. Periodic clipping of the hair is therefore a great relief to such animals during hot weather and facilitates the destruction of ticks. The long hair makes excellent cover for these parasites and affords protection against poisonous sprays applied to destroy them.

The fine hair of the Jerseys, in comparison to the rough coats of the Friesians, makes them more suitable in this respect for the tropics.

For keeping the hair of stock short a hand-power flexible shaft-drive clipping machine, as commonly used for horses, has been employed with success on the farm.

With regard to the control of ticks, the policy at Serdang is to spray all animals with an arsenical cattle dip once a week. In addition, any casual ticks which may gain access to the stock in the interval between spraying operations are removed by hand-picking during grooming.

Health of the Stock.

While the general health of both the locally-bred and imported Indian animals has so far proved satisfactory, that of the various imported European breeds has been indifferent in spite of the greatest care in housing, handling and feeding.

The Indian breeds are apparently immune to Red Water Fever (Piroplasmosis) caused indirectly by the incidence of ticks, but imported cows of the European breeds are very susceptible to it; the bulls, on the other hand, once they are acclimatised, appear to resist infection.

The following brief account of the behaviour of the various importations of European breeds under conditions obtaining on the plains at Serdang is of interest in this connexion.

(1) *Ayrshire Cows from Australia.*—The two grade Ayrshire cows, with calves at foot, transferred from Johore in June, 1928, never appeared to be in a normal state of health at Serdang. One cow succumbed to Pneumonia in November, 1928, after being treated for Piroplasmosis and the second cow died of *Gastro enteritis* in May, 1929, which disease was associated with Piroplasmosis.

Owing to sickness of the dams, the calves from these two animals did not get a good start in life and were to some extent stunted. One of them contracted Pneumonia and died in May, 1932, while the second

animal proved to be sterile and therefore was sold for beef at the end of that year.

(2) *Friesian Bulls from Hong Kong.*—The two pure-bred Friesian bulls received from Hong Kong in October, 1929, were just over one year old when they arrived at Serdang. Both animals were received in good condition and to date have shown little sign of sickness. One of them suffered from a mild attack of Piroplasmosis shortly after arrival, but on being treated with intravenal injections of trypan blue, soon recovered its normal health.

(3) *Friesian Cows from Australia.*—The six pure-bred Friesian heifers introduced from Melbourne in June, 1930 proved a failure. On the other hand, it should be mentioned that all these animals were received in poor condition with the result that, in spite of every precaution being taken to keep them free from ticks, they all contracted Piroplasmosis within a few weeks of their arrival at Serdang, one of these animals dying from the disease; shortly afterwards a second animal contracted anthrax and died. During 1932, two other cows died of *Gastro enteritis*, probably as a result of general debility caused by Piroplasmosis, while another cow recently lost condition to such an extent that it had to be destroyed. The remaining cow and three heifers have remained moderately healthy since the initial attacks of tick fever, which probably immunised them to some extent against further infection.

The above results indicate the difficulty of keeping cows of the European breeds in satisfactory condition on the plains in Malaya. On the other hand, the bulls of such breeds, when regularly sprayed with arsenical cattle dip, are comparatively free from Piroplasmosis.

The apparent relative immunity to Piroplasmosis of the Indian breeds and of cross-bred animals, the progeny of Indian and European stock, is a great asset in the establishment of a dairy herd in the tropics. This, however, does not eliminate the need for constant attention to the eradication of ticks from both locally-bred and imported animals by spraying and grooming. If this is neglected, the general debility produced by tick infection weakens the animals and this renders them liable to contract various diseases common to cattle in the tropics.

Observations on Preliminary Breeding Trials.

Since the farm has only been in existence for a comparatively short period, there has obviously been insufficient time to obtain any very definite results on the breeding trials. In the meantime, however, successful first and second crosses have been obtained between Friesian and Montgomery breeds. It will be interesting to watch the performances of these animals, both as regards milk production and immunity from tick fever.

Mention may also be made of the Jersey x Montgomery cross-bred cows transferred from Fraser's Hill, since these animals have been apparently immune to Piroplasmosis. Although only two lactations have been completed to-date by these cows, it has been shown that the monthly yields of milk are high. One of the cross-bred cows has given a yield of 456 gallons of milk during a lactation period of twelve months.

The upgrading of the pure-bred Montgomery animals is being followed as far as the smallness of the herd permits.

Although considerable difficulty is experienced in inducing the Montgomery bulls to serve the pure-bred Friesian cows to obtain the Montgomery x Friesian cross-bred, there is little trouble in procuring the Friesian x Montgomery cross-bred, since the Friesian bulls are much more active than the sluggish Montgomery bulls.

In view of the apparent unsuitability of the lowland climate in Malaya to the pure-bred European types of cows as opposed to the bulls, the latter should always be employed for crossing with the Indian Montgomery cows in cases where cross-bred animals are desired. Apart from this factor, allowance must be made for the prepotency of the bull in transmitting to the offspring the high milk-yielding qualities inherent in the animal. Therefore, the offspring of a Friesian cow mated to a Montgomery bull is likely to have a lower milk yield than its dam, while the reverse cross should have the opposite effect. Similarly, a cross-bred Friesian-Montgomery bull would probably have a much greater influence on milk production of the progeny than a pure-bred Montgomery bull.

General.

Although the purpose of this experimental stock farm is primarily for carrying out research in animal husbandry, a careful study has been made of the production of high-grade milk. The modern methods of dairying adopted on the farm have shown that it is possible with Asiatic labour, properly supervised, to produce high-grade milk in the tropics.

In addition to the work already recorded, a not inconsiderable number of pure-bred and cross-bred bulls of the different breeds have been distributed throughout the country for the improvement of local livestock.

The writers acknowledge the useful work of Mr. N. Kanagaratnam, Stock Farm Assistant at Serdang, who has had detailed charge of the farm, also the services rendered by the Government Veterinary Surgeon, Selangor and his assistant, who have been of great assistance in the diagnosis and treatment of sick animals.

Refereuce.

(1) Manurial Experiments with Guinea Grass at Serdang. By V. R. Greenstreet and J. L. Greig, *Malayan Agricultural Journal,* Vol. XXI No. 11, November, 1933, p. 543.

PANCHANG BEDENA CONTROLLED DRAINAGE SCHEME

BY

J. L. MILLER,

Drainage and Irrigation Engineer, Telok Anson.

The area embraced by the above scheme consists of approximately 15,000 acres of the coastal flats in the sub-District of Sabak Bernam in the State of Selangor. It is bounded on the west by coconut estates, on the north by the Bernam River, on the south-east by a forest belt and *permatang** and on the south-west by the Straits of Malacca.

The scheme is one of "Controlled Drainage" and consists primarily of three main drains, the largest of which has a bottom width of 20 feet, running paralled to one another from north-east to south-west and discharging into the Straits of Malacca. The largest has also an outlet, at the north, into the Bernam River and is graded to fall both ways from the centre. All four outlets are gated and fitted with automatic tidal flaps on the outside, together with positive action sluice valves on the inside. In this way, not only is salt water prevented from entering the system, but the water inside the drains can be maintained at a constant level.

The area is protected from high tides on the sea side and from flooding from the Bernam River on the north by substantial peripheral bunds which are built up to 2 feet above the highest recorded tide level and have a top width of not less than 10 feet. The eastern extremity of the coastal bund is carried northwards to the point where the land rises to the *permatang**. The western side of the area is protected by the existing coconut estates, and a low bund with a top width of 6 feet is sufficient to give control of the ground water required for cultivation.

Discharging into the main drains and running at right angles to them are sixteen cross drains, each with a bottom width of 8 feet. Each cross drain has its own control gate so that the water level in any drain is independent of the water level in the main drain.

The spoil from these drains is utilized to form bunds parallel and adjacent to them which have the effect of making each strip of land between two such drains into a separately controlled drainage area. The bunds also serve the useful purpose of access paths.

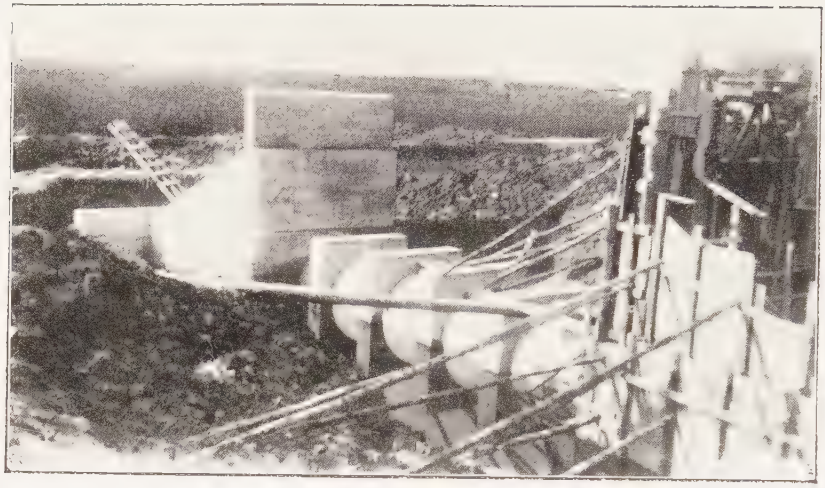
The drainage in the whole area is, therefore, completely under control. All gates can be opened to dry the land before harvest and in the padi-planting season, individual gates may be closed to retain in each particular section, sufficient water for cultivation.

The total lengths of main and subsidiary drains in the area are approximately 12½ miles and 45 miles respectively and the average area of each

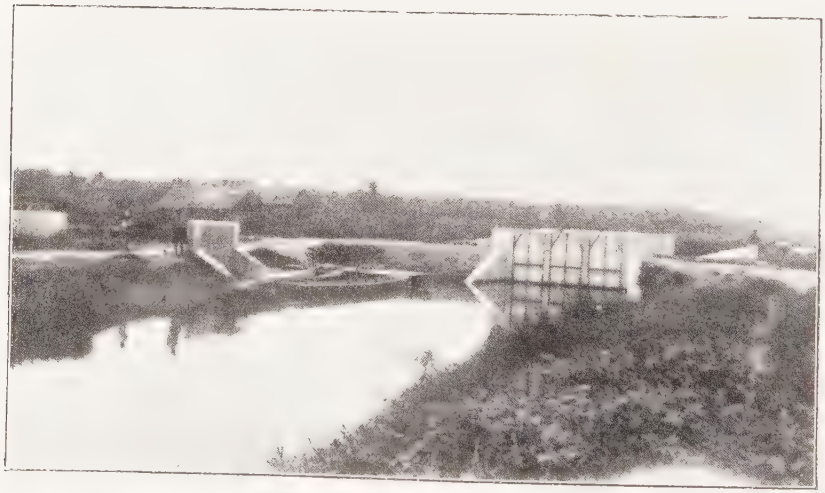
* Ridge of higher land, sometimes old sea-beach.

Cross drain A_2 D_4 being excavated.

Banjaree Coolies at work on cross drain A_4 indicating the nature of the work.



Subsidiary control gate on a cross drain
under construction.



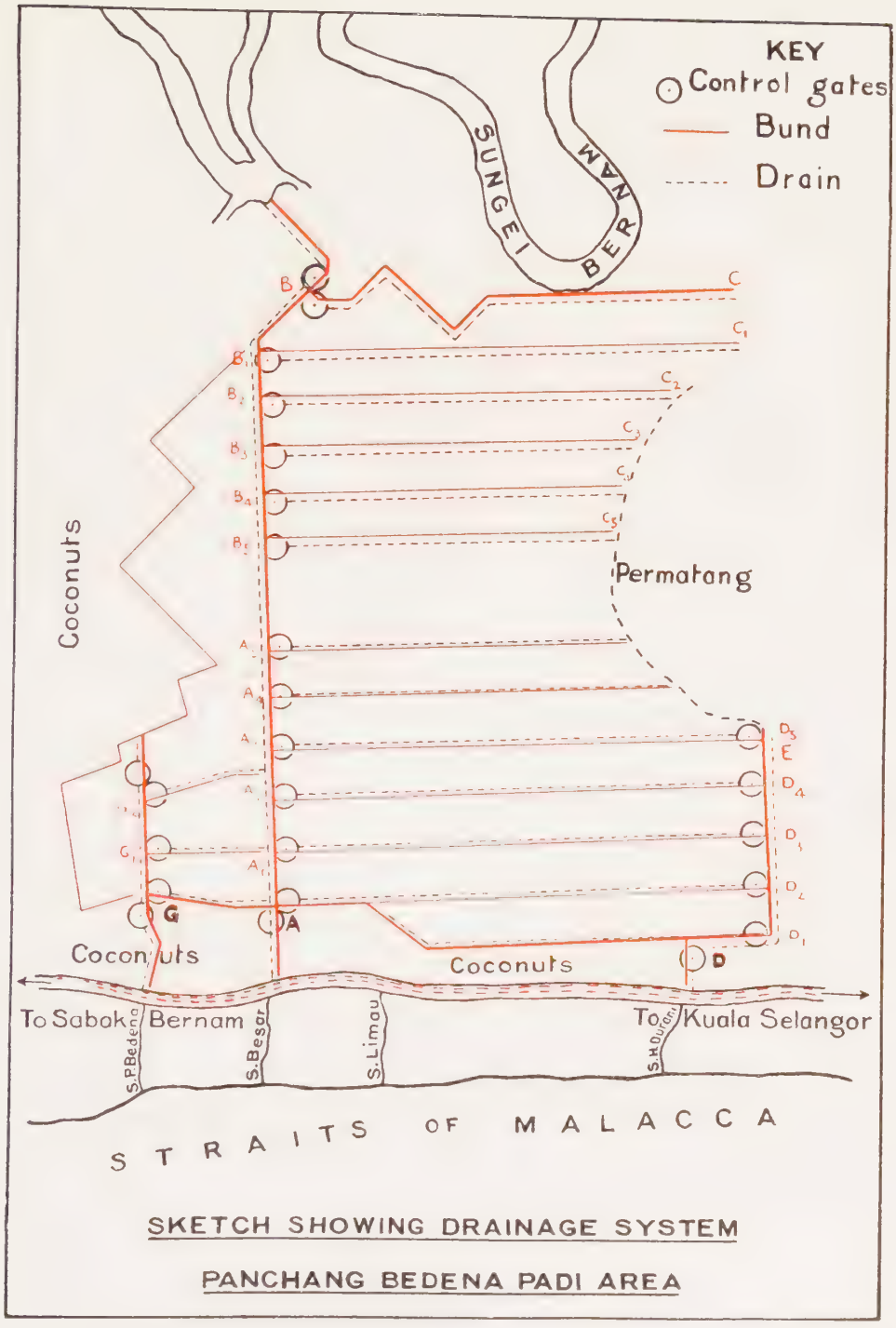
Main and Subsidiary Control Gates, Sungei Besar.

CONSTRUCTION OF CROSS DRAIN A_2 D_4 SHEWING NIBONG ROOTS ENCOUNTERED.

BANJAREE COOLIES WORKING UNDER DIFFICULTIES.

Part of the Main Drain from Sei Besar to the Bernam River after completion.

New opened up land.



SKETCH SHOWING DRAINAGE SYSTEM

PANCHANG BEDENA PADI AREA

controlled section is approximately 900 acres.

All control gates are of the long culvert type. The 42 inch diameter reinforced concrete pipes are laid on a concrete raft on a *bakau* foundation.

Progress of Work.

The work is now about two-thirds completed and is expected to be finished by the end of 1934. Jungle clearing for the drain reserves, gate construction and main and subsidiary drain excavation are being carried out in sequence and, as each successive subsidiary drain is completed, a further controlled area becomes available for cultivation.

It is estimated that 6,000 or 7,000 acres have already been felled of jungle and are under padi at the time of writing. The control of the water levels in the completed sections is proving quite successful.

The rapidity with which the land is being occupied is exceedingly gratifying. In the initial stages, the work of felling and opening up went ahead of the control works. This fact is interesting in view of the gloomy fears expressed in some quarters that colonisation of new rice lands will be a failure.

Colonisation, though difficult, has up to the present presented no insuperable obstacles in spite of the fact that the activities of the Drainage and Irrigation Department have already resulted in the provision of new padi lands up to a total of nearly half the area of the lands watered by the Krian Irrigation Works.

The geographical position and topographical nature of the land have been the two factors governing the work of construction. Access, either by land or sea, was (and still is) difficult and conditions of life in no way help to retain labour which has been attracted to the area.

Parts of the jungle which covered the area contained an unusually large proportion of nibong (*Oncosperma filamentosa*, Bl.) the poisonous spikes of which hindered the work of clearing, while the roots proved an equal hindrance during earthwork.

While the uniform flatness of the ground is ideal from the padi cultivators' point of view, it was unpleasant to find that the jungle held up standing water throughout the year. Jungle clearing and burning for the drain reserves was therefore difficult. Drain excavation was carried on rapidly during the dry season but, in wet weather, the actual rainfall, added to the heavy run off from the newly opened areas, made conditions extremely unpleasant. Two of the accompanying photographs give a good idea of working conditions.

Work of a good standard is, however, being carried out at low rates and the cost of the scheme is expected to be between $16 and $17 per acre.

CONDITIONS ON SMALL RUBBER HOLDINGS IN MALAYA.

1st Quarter 1934.

Prepared by the Economics Branch of the Department of Agriculture, S.S. and F.M.S. in collaboration with the Field Branch of the Department of Agriculture.

Rainfall.

The month of January was characterised by an unusual period of wet weather, giving a rainfall much above the average in all parts of the Peninsula except in the State of Kedah and Kelantan and a few other localities including Cameron Highlands. The wet period occurred generally during the first fifteen days to three weeks of the month, but in Krian and Larut Districts of Perak and on Cameron Highlands the middle ten days constituted the wet period. While Krian and Larut Districts experienced a heavy rainfall, minor floods occurred in Pahang and more severe floods in Johore and Singapore Island. During February in Pahang and Selangor warm dry weather was interrupted by fairly frequent thunderstorms and high winds; in Negri Sembilan, Malacca and Johore, warm dry weather prevailed. In Kelantan and in Singapore Island the first half of the month was cool and showery, while the second half was warm and dry. Conditions during March were nearly normal in Kedah and Kelantan, though the rainfall was somewhat below the average and in the eastern State the second half of the month was hot and dry. The rainfall was much above average in the southern part of the Peninsula, from Negri Sembilan to Singapore Island, being especially heavy in the first half of the month when floods occurred in Johore and Singapore Island.

Prices.

Table 1 which is appended shows the ruling prices for the period January to March 1934 for small holders' rubber, and it will be noted that there has been a further increase in price as compared with the 4th. quarter of 1933.

Table II.

Average Singapore Prices for Small-holder's Rubber.

	Smoked Sheet $	Unsmoked Sheet $	Scrap $
January	19.00	17.50	6.00
February	20.00	18.50	8.50
March	22.00	20.50	7.50

Table I.

Rubber Prices [in Straits dollars per picul (133⅓ lbs.)]

1st Quarter, 1934.

	Singapore standard sheet Average	Singapore for small holder's rubber at end of month	Penang for small holder's rubber	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Province Wellesley	Kedah	Johore (Av: of 10 centres)
						JANUARY					
Smoked sheet.	19.32	19.00	—	13.50-18.75	14.00-19.50	14.00-18 65	10.00-19.90	16.00-17.00	16 00-18.00	14.50-19.50	14.00-16.50
Unsmoked sheet.		17.50	13.50-16.50	11.00-16.00	12.00-17.50	10.00-16.50	8.00-16.50	10.00-15.00	14.00-16.50	12.50-17.00	12.30-13.67
Scrap		6.00	4.00-7.00	3.00-6.50	3.00-7.00	2.00-6.00	3.00-6.50	4.00-6.00	5.00-6.00	4.00-7.00	4.00-5.00
						FEBRUARY					
Smoked sheet	21.66	20.00	—	14.00-21.50	17.00-22.00	17.00-21.60	15.00-21.50	20.00-21.00	20.00-21.50	15.00-21.00	17.35-18.86
Unsmoked sheet		18.50	15.00-20.50	14.00-19.50	15.00-20.75	15.00-20.00	8.20-20.00	14.00-19.00	18.00-20.00	13.50-18.00	14.66-18.00
Scrap		8.50	5.00-8.00	2.50-9.00	4.00-8.00	4.00-8.00	3.00-8.00	5.00-9.00	7.00-8.00	5.00-8.00	4.25-5.91
						MARCH					
Smoked sheet.	22.77	22.00	—	18.50-23.00	19.00-23.80	19.00-23.00	17.20-23.00	21.00-22 50	20.00-23.00	18.00-24.00	19.36-21.90
Unsmoked sheet.		20.50	19.00-22.50	16.00-22.00	14.00-21.50	15.00-20.25	13.00-20.00	16.00-21.00	17.00-21.00	17.00-22.00	17.00-19.80
Scrap		7.50	7.50-9.00	3.00-8.50	4.50-10.00	4.00-9.00	4.00-8.00	5.00-9.50	7.00-9.50	6.00-8.50	5.00-6.00

The quotations in the Table show the ruling prices from a large number of buying centres. Factors such as transport and local competition affect the prices secured by the small-holder for his rubber.

Table II shows the trend of average prices ruling in Singapore per picul at the end of each month for *Kampong* rubber.

Tapping.

Reports from Negri Sembilan state that tapping systems remain substantially unaltered, extreme cases of excessive excision have been noted, as also has the use of ladders; these, however, are not common. Several holdings, the extent of which have not as yet been determined, are reported to have been newly opened up in the Coast District, but no areas of immature trees have been noted in production. As the price of rubber improved, many holdings in Selangor and other States were brought back into tapping, whilst no cessation of tapping was noted during the wintering period. In Malacca tapping continued to be heavy, opening of high panels, necessitating the use of ladders being quite a common practice. Reports from Penang and Province Wellesley state that tapping has been extremely active and that no abatement was observed during the wintering season, whilst in Kedah heavy tapping was continued throughout the quarter. In some districts in Perak, holdings have been cleaned up and tapping re-commenced. The area of untapped rubber is now low. Pahang reports state that a fairly considerable area of young rubber has been brought into tapping. The tapping generally is good but in some cases over-tapping has been practised.

Areas out of Tapping on Small Holdings.

The method of estimating the area untapped among small-holdings by means of counting the number of such holdings along the sides of main roads was again employed, the result of this computation is shewn in Table III and was applied to the known area of tappable rubber, 1927 planting and earlier.

The total area of tappable rubber on estates of less than 100 acres which was untapped in the Federated Malay States at the end of March 1934 is estimated on the foregoing system as amounting to approximately 34,950 acres as compared with 45,000 acres at the end of December 1933. The total area untapped in the Straits Settlements at the end of March 1934 is estimated to be 9,900 acres as compared with 14,000 acres at the end of December 1933.

Diseases.

Mouldy Rot.—Weather conditions favoured the spread of mouldy rot throughout Negri Sembilan during January. With a considerably reduced rainfall during February, the disease rapidly diminished and despite the fairly wet conditions of March, the situation at the end of the quarter was satisfactory. Reports from Selangor state that the disease was well under control during

the quarter, and similar reports were received in regard to the Settlement of Malacca. There was little to record regarding mouldy rot disease in the State of Kedah but the distribution of disinfectant was continued and was considerable. Perak reports state that mouldy rot was the only disease of real importance during the quarter. The increase in price of the commodity has resulted in painting being given somewhat more attention, but on the other hand, wet weather resulted in greater virulence of the disease. Departmental sales of an approved fungicide were not large, but many owners of rubber land purchase their requirements from local vendors. Tar remains a very common painting material in most localities. In Pahang, however, the sale of disinfectant has proved very popular. Towards the end of the quarter, the disease was again well under control.

Oidium Leaf Disease.—In the State of Negri Sembilan, 16 estates notified the presence of *Oidium Heveae* after the commencement of wintering, whilst in Selangor only one outbreak was reported. Reports from Malacca state that *Oidium Heveae* occurred in the usual areas, outbreaks of this disease also occurred on Central and South Kedah, but these were not severe and by the end of the quarter, following good rains, the attacks had almost disappeared.

Grades of Rubber Made.

Figures of the percentages of the various grades of rubber produced, where these have been recorded, are as follows:—Penang and Province Wellesley: (figures from 26 dealers) smoked sheet 17, unsmoked 66, scrap 17.

Kedah:—smoked sheet 48, unsmoked sheet 19, scrap 33.

Malacca:—smoked sheet 15, unsmoked sheet 64, scrap 21.

Selangor:—smoked sheet 80, unsmoked sheet 1, scrap 19.

Perak: Taiping:—smoked sheet 32, unsmoked sheet 50, scrap 18.
Kuala Kangsar:—smoked sheet 30, unsmoked sheet 41, scrap 29.
Larut and Matang:—smoked sheet 1, unsmoked sheet 78, scrap 21.
Selama:—smoked sheet 80, unsmoked sheet 15, scrap 5.

Johore: Muar:—smoked sheet 32, unsmoked sheet 58, scrap 10.
Batu Pahat:—smoked sheet 81.5, unsmoked sheet nil, scrap 18.5.
Tangkak:—smoked sheet 50, unsmoked sheet 35, scrap 15.
Pontian:—smoked sheet 5, unsmoked sheet 80, scrap 15.
Johore Bahru:—smoked sheet 25, unsmoked sheet 48, scrap 27.
Kota Tinggi:—smoked sheet 15, unsmoked sheet 60, scrap 25.

Table III.

Estimated Acreage of Tappable Rubber which was out of Tapping on Holdings of less than 100 Acres, at the end of March, 1934.

PERAK				SELANGOR				NEGRI SEMBILAN				PAHANG			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage
Batang Padang	37,288	750	2	Klang	18,879	2,300	12	Seremban	19,241	1,200	6	Raub	7,361	1,200	16
Kinta	34,180	1,600	5	Kuala Langat	29,263	1,200	4	Tampin	17,947	1,300	7	Kuala Lipis	15,951	300	2
Kuala Kangsar	43,485	2,200	5	Ulu Langat	38,867	400	1	Kuala Pilah	17,470	1,900	11	Bentong	13,600	1,800	13
Upper Perak	13,774	1,500	11	Ulu Selangor	30,632	2,100	7	Jelebu	6,270	200	3	Other Districts	31,223	2,800	9
Larut & Selama	51,497	3,100	6	Kuala Lumpur	21,174			Port Dickson	10,653	1,000	9				
Krian	9,751	4,200	43	Kuala Selangor	9,379	1,500*	5*								
Lower Perak	47,937	2,400	5												
	237,822	15,750	7		148,194	7,500	5		71,581	5,600	8		68,135	6,100	9

MALACCA				PENANG & P. WELLESLEY				SINGAPORE			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage
Central	17,687	1,400	8	North	3,241	100	2	Singapore	12,781	1,000	8
Alor Gajah	31,387	5,000	16	Central	7,067	800	12				
Jasin	24,971	500	2	South	8,149						
				Dindings	7,279	900	12				
				Penang	11,114	200	2				
	74,045	6,900	9		36,850	2,000	5		12,781	1,000	8

The percentage of areas out of tapping in December, 1933, was as follows:—Perak 6, Selangor 11 the Negri Sembilan 12, Pahang 10, Malacca 14, Penang and Province Wellesley 5, Singapore 15.

* Estimated from same percentage as shown in Kuala Kangsar District.

† Estimated from mean percentage for remainder of State.

Reviews.

The Giant Snail in Batavia.

An article by S. Leefmans in *Landbouw* of December 1933 entitled "Preliminary Report on the Control of Achatina in Batavia" deals briefly with the steps taken in Netherlands India to control this pest.*

Damage was conspicuous only on banana leaves, though damage to flowering and ornamental plants is also noted. More extensive damage to vegetable gardens was prevented, it is claimed, by the measures taken before the pest had increased sufficiently as to prove a menace.

The snails feed on human and animal excreta, and will also enter buildings in search of lime. It is feared that the snails may spread to estates where they may multiply rapidly and become a serious pest.

In one large centre a campaign was organised to collect the snails. More than two million were caught and destroyed.

Two large centres in Batavia were cleared of snails by collection and by chemical measures. After clearing the growth, the infested area was sprayed with 4 per cent. copper sulphate. Furthermore, hedges and walls in the neighbourhood were white-washed with calcium arsenate. The snails have a real lime-hunger and so can easily be poisoned. These two areas are now totally free of snails.

As calcium arsenate is easily washed away from walls and trees by tropical rains, it is incorporated with lime and cement, of which mixture small lumps are prepared. These lumps are put in heaps in the infested area and if the snails feed on them they die within four days.

The method of poisoning described in this article is worthy of trial in Malaya. The use of copper sulphate in this connexion is well known and has met with some success in Malaya. Hand collection has been tried on a large scale, especially in Johore, but has not met with conspicuous success. Poisoning with calcium arsenate stones coupled with clearing up all possible breeding places should be an effective measure of control.

D. H. G.

Rubber Research Institute of Malaya Information Cards.

The Rubber Research Institute has published a series of seven Information Cards, suitable for desk or wall use, dealing with the manufacture of rubber. The titles are:—Standardisation and Coagulation, Some Estate Chemicals and their Uses, Defects in Rubber (two cards), Preservation of Latex for Export, Testing Preserved Latex, Useful Information. The set is contained in a folder and published at 50 cents in Malaya and $1 outside this country.

By reason of the concise method of presentation and the valuable information, rubber estate managers will find these cards a useful addition to the office table.

* See also Review of another paper on this subject by the same author and another, published in the *Malayan Agricultural Journal* Vol. XXI No. 11, November 1933.

DERRIS ROOT AS A NETHERLANDS INDIA EXPORT PRODUCT.*

Substances used for the purpose of killing insect pests may conveniently be classified as (i) inorganic poisons, such as compositions of lead, copper, arsenic, sulphur, selenium; (ii) organic poisons, such as nicotine, thiocyanate, pyrethrum and derris extracts and (iii) petroleum compounds.

The use of many inorganic poisons, when applied to plants intended for consumption as food, involves risk of poisoning to mankind and animals.

To avoid the absorption by the human system of poisonous insecticide substances, a more direct method is being sought; at present the endeavour is to find insecticides which exercise a more specific action upon the insects and that will present no dangers to man.

However, just as there exists no panacea for all maladies and complaints, so there is no universal insecticide that can fight the very large number of noxious insect varieties in a practical and successful manner; so that the above-mentioned injurious insecticide substances will undoubtedly be retained in their proper places, although it is the intention to limit their use as greatly as possible and substitute for them insecticides not dangerous to the human system.

A good deal of attention has been paid to nicotine which, though a poisonous substance, might be less dangerous than are the inorganic insecticides. But both in the application of this chemical and in the consumption of products on which it is applied, cases of nicotine poisoning have been reported.

Extracts of pyrethrum have been tried, and also different varieties of derris and cubé roots, the active principle thereof being rotenone. It has been found that not only are such extracts practically non-poisonous to men and animals, but also that chiefly the extract of derris, or rather the rotenone, is much more destructive to a good many noxious insects than are the inorganic insecticides and nicotine. Poisonous action upon useful insects is but slight, seeing that derris insecticides retain their toxicity, once they have been sprayed upon the plants, for only a short time—which, however, in itself constitutes an objection to its application. To birds these and the pyrethrum compounds are harmless. For human beings rotenone, even in fairly considerable quantities, is without noxious effects. It is for this reason that such combination is employed in fighting exo-parasites of animals, as in cattle dips, and favourable results have also been observed in their effect on endo-parasites. In addition, rotenone can be used with considerable success to keep woollen articles moth-free.

The difficulty that rotenone, under the influence of direct sunlight, rapidly oxidises into inactive derivatives has been counteracted by adding soot to the liquid to be sprayed. But it has been found that dihydro-rotenone prepared

* Abstract and Review of an article by D. R. Koolhaas in the *Economic Bulletin of Netherlands India* Vol. I, No. 3, February 16th, 1934.

from rotenone through reduction according to a process analogous to the hardening of fatty substances, has at least the same insecticidal properties as has rotenone itself, and is more resistant to the influence of air and light.

Besides rotenone there are to be found in derris other substances with insecticidal properties, namely, degueline, tephrosine and toxicarol.

In some cases, rotenone is a stronger insecticide than is pyrethrum extract, which is its closest competitor.

Originally, an extract of derris root made by means of water and diluted with soapy water, was used as a direct insecticide. On account of the facts that a total extraction of poisonous substances was not readily effected by this method, that such extracts cannot be kept good without the addition of preservatives and also because the roots vary greatly as regards their poison contents, this method was found to be unreliable. Seeing that the rotenone is very much more poisonous to insects than are the other combinations present in the root, *Roark* suggested that the rotenone content is the only method by which to judge the value of the roots.

This is all the more important in view of the fact that various firms market not only a total extract from derris root, but also more or less pure rotenone.

Roots that have a content of less than 3 per cent. can be discarded when rotenone is to be prepared. The exporters of the root, whether it be a forest product or an estate-grown product, can demand a higher price if the rotenone content is in excess of the normal. *Roark* states that if planters will not supply derris root having a guaranteed rotenone content, it is very probable that the consumers will purchase cubé roots from Peru and Brazil.

This requirement is especially of importance in the case of the Netherlands India product, as it has a somewhat unsatisfactory reputation in this respect. Based on analyses of derris root samples from the forests of Western Java, it is concluded that this bad reputation is, generally speaking, unmerited, or at least unnecessary.

Information is given regarding derris cultivation, selection of stock and age at which the plant should be harvested. Methods of distinguishing good forest-grown derris roots from the useless parts of the plants are indicated. Deliberate substitution of other roots, which may occur in the forest-grown derris, is a reason for preferring the cultivated product.

The article states (on page 388) that in Malaya there is a derris estate at 1425 metres above sea level. This is inaccurate. Derris is not being grown as an estate crop in Malaya at this elevation. There may be small areas at this elevation, but not an estate.

Mention is made of other plants containing rotenone. At present, however, the only plant of importance besides derris, as a source of rotenone is *Lonchocarpus nicou* or cubé from South America. Commercial samples, 23 in number, which were analysed, shewed a rotenone content varying between 0.8 and 11.2 per cent., representing an average of 5.4 per cent. and a close

relation between the ether extract and the rotenone content. Derris is regarded as of more importance as an insecticide as it contains a higher proportion of other substances that have the same effect as rotenone.

It is considered that the use of rotenone-containing roots for insecticidal purposes will certainly increase in years to come. The use of pyrethrum is already fairly extensive, but in view of the manner in which derris is advertised and recommended, especially by the Government of the United States of America, its more extensive use may fairly be predicted, to the lesser employment of other insecticides, including perhaps pyrethrum. Also, a combination of derris and pyrethrum seems to result in a very useful insecticide, the application of which may prove to become even more general than that of either separately.

London prices of derris root in 1933 are stated, followed by brief information of packing for export and on sampling for analysis.

As it is very probable that derris, for certain soils and under definite conditions, especially when high-grade clones are planted, opens up possibilities for a paying cultivation, either as a sole or as a mixed cultivation, it will not appear strange that this plant, for some time past, has attracted a good deal of interested attention on the part of the various institutions connected with the Department of Economic Affairs in Netherlands India. Endeavours are now being made to obtain high-grade clones that can be used for planting, whilst the investigation of wild varieties and forms is being actively continued so as to assist the exporters of the forest product by supplying them with accurate information, and in order to have available in as short a period as possible, a considerable quantity of good planting material.

Note :—The above Abstract is published in this place to draw attention to the interest in derris evinced in Netherlands India. At the same time, the Department of Agriculture, Straits Settlements and Federated Malay States, does not necessarily agree with the views on the chemistry of the toxic substances put forward in this article. In particular, it is not yet admitted that there is conclusive evidence shewing that rotenone is the most active or most important toxic constituent in derris root. Work on this and other points is actively in progress in the Department. Naturally, the question of which, precisely, is the most important constituent does not affect the value of the root as a whole.—*Editor.*

SEVENTEENTH REPORT ON THE NATIVE RUBBER CULTIVATION

Fourth Quarter, 1933.

Prepared by the Bureau of Agricultural Economics of the Agriculture and Fisheries Service of the Netherland Indian Department of Affairs at Batavia, Java. G. Kolff & Co., Batavia.
February 1934.

Prices.

During the first four months of 1933, the price of standard sheet rubber at Batavia averaged 7 guilder cents per ½ kg., after which, as a result of the economic measures taken in the United States of America, and a little later supported by the restriction negotiations, there was a firm price improvement, the price level rising to 12 guilder cents, and in November and December to 13 and 13¾ cents. The quotations for "blanket" followed this rise somewhat irregularly and less definitely: up to and including July, "blanket" prices remained at an average of 80 per cent. of the standard sheet quotations, after which this relation became modified to the disadvantage of the "blanket" article, amounting in the months of September 1933 to January 1934, inclusive, to 71 per cent., 65.6 per cent., 66.2 per cent., 67.4 per cent., and 70.4 per cent. thereof, respectively, this being the outcome, probably, of the relatively greater increase of "blanket" production in relation to "sheet" production, causing the former to be absorbed by the market at lower prices.

Exports.

The exports of the native rubber from Netherlands India sharply reacted to this price increase: quarterly exports of native rubber in net metric tons were:—13,420; 25,597; 36,687; 38,954 respectively. The total exports of rubber from the Outer Provinces in 1933 were 116,158 tons, which is a record. The increased exports, especially in the second half of the year, are attributed in part to the gradually increasing world price level and to labour becoming available upon the conclusion of the season's agricultural activities.

Local reports clearly indicate that, despite this high export figure, as yet less than one half of the tappable trees are in exploitation.

Labour.

Even now, hardly any outside labour is being used for tapping; it is done mostly by means of family labour with the assistance of local forces paid in production. Rubber cultivation in all Provinces still remains a secondary

occupation to food-crop production and this condition can only be looked upon as a satisfactory state of affairs.

The production increase in 1933 over 1932 is almost entirely represented by the group "wet slabs". The exports in metric tons (not in terms of dry rubber) of "rubber in cakes and slabs" during 1933 were 140,607 tons as compared with 67,655 tons in 1932.

Estate and "Native" Rubber.

A survey of the rubber exports from the principal centres of production is presented in a Table which indicates the very different reactions to the prevailing prices. The production of all groups since the second half of 1932 has increased, but in very varying degrees. Estate rubber reacted least of all, this product evidently not being able to adapt itself so readily to the circumstances brought about by the changeable prices as could the native cultivation. The strongest reaction, both to low and to high prices, is exhibited by the native production in Netherlands India, of which the export in the first six months of 1932 amounted to 48.3 per cent. only of that in the corresponding period of 1929, but increased to 143.8 per cent. in the second six months' period of 1933. The character of this cultivation as a secondary source of profit and the fact that a very considerable rubber-growing area is involved, makes it possible for it to react so acutely to world prices.

Local Reports.

Achin and Dependencies.—Despite activities connected with rice cultivation, rubber tapping increased, resulting in an export during the fourth quarter of the year of 165 tons as compared with 109 tons in the third quarter. It is estimated that at present about 30 per cent. of the tappable area is in production. Prices in Langsa in guilder cents per 100 kg. wet slabs were from f 6.20 to f 6.80 in October and for the last two months of the year around f 8.40.

Tapanoeli.—The exports from Sibolga amounted to 824 tons of dry rubber and, for the first time in 1933, of a small quantity of slabs. Local native market prices for first quality "Sheety crepe" varied between 14 and 15 guilder cents per kg. An improvement in quality is noted. Increased tapping applies to the older gardens and less to the younger and more distant holdings. The area at present being tapped is estimated to be from 40 to 50 per cent. of the total tappable area.

Sumatra West Coast.—Exports were 106 tons (dry equivalent) as compared with 60 tons in the third quarter. The recently-opened rubber mill at Padang worked up a considerable quantity of slabs into blanket rubber. Prices at Kota Baroe varied from f 4.50 to f 4.00 and at Bangkinang from f 2.30 to f 3.20. Although a number of gardens were cleaned up, considerable areas remain untapped.

Palembang.—During the quarter 5,660 metric tons were exported as against 4,982 tons during the third quarter of the year. December exports are exceptionally high at 2197 metric tons, attributable to completion of other work on

native holdings, demand for cash for approaching "Lebaran" festivities and to high market prices for rubber. At present prices further increased production is anticipated. In January 1934, 3371 metric tons of wet rubber was shipped from Palembang as compared with 3160 tons in the preceding month.

Djambi.—Exports increased considerably, being 8,492 metric tons in the last quarter compared with 6931 in the third quarter, 5170 tons in the second quarter and 3792 tons in the first quarter.

Increased production is attributed to favourable price, demand for cash and favourable weather conditions for tapping.

Riouw and Dependencies.—From the mainland 2706 tons (in terms of dry rubber) were exported and 577 tons from islands. Figures for the preceding quarter were 2528 and 326 tons respectively. The holdings in the islands are mostly owned by Chinese who are working with local or imported labour. In the sub-division of Lingga, sheet rubber was about 7 guilder cents per kati in the third quarter and 8 cents in the fourth quarter. Buyers and exporters are Chinese. Freight to Singapore is estimated by them at about $1 per picul.

Banka and Dependencies.—265 tons were exported from Banka, 218 of which consisted of sheet rubber and 41 tons of slabs, figured in dry equivalent. Export of sheet rubber increased considerably in the second half of the year. In the course of but a few months dozens of rubber mangles have been imported, the Chinese owners hiring them to rubber tappers. The sheets weigh from 1—1½ kati and are sometimes of good quality. Sheets of lower quality are again worked up in Singapore into blanket rubber, whilst the better sheets receive no further treatment.

Western Division of Borneo.—Exports in the fourth quarter amounted to 7,260 tons dry equivalent as compared with 8,226 tons in the third quarter. The decline is attributed to seasonal agricultural activities and to wet monsoon weather which reduced the number of tapping days. It also appears that Chinese are keeping back considerable quantities of rubber. Prices in Pontianak, in guilders per picul, varied from f 4.00 to f 5.50 in October; f 4.60 to f 6.50 in November and f 4.00 to f 6.25 in December. In the quarter under review there were still important areas left untapped.

Southern and Eastern Division of Borneo.—Exports fell from 8,386 tons dry equivalent in the third quarter to 6,988 tons in the fourth quarter. This decline is attributed to the rice harvesting and planting activities. It is likely that a higher export figure will be reached in January 1934.

The price per 100 kg. of wet and dry slab at different centres is stated. As an example of the price movement: at Kandangan wet slab was f 4.20 in October and f 5.20 in the latter part of December, while dry slabs varied from f 7.50 to f 7 in October to f 8.50 in December.

Miscellaneous.

BALIK PULAU, PENANG, AGRICULTURAL SHOW.

The third Balik Pulau Agricultural Show was held on March 30th. and 31st. and April 1st. The last Show in this District was in 1927.

Prizes were awarded for 162 classes, arranged under 9 sections.

The first phase of the Malayan Agri-Horticultural Association Padi Competition was run in connexion with the local padi competition, the best three samples, which were of extremely high quality, being selected for subsequent despatch to the Malayan Exhibition at Kuala Lumpur.

With the exception of fruits, most of which were out of season, all classes were well represented.

The Department of Agriculture staged special exhibits of an instructive nature on mushroom cultivation, the etiolation method of propagating fruit trees, the production of improved copra, and on rat destruction.

The Chairman of the Committee, Mr. A. V. Aston, and those associated with him in this event, are to be congratulated on a most successful show, which it is hoped, will now become an annual affair.

MEETING OF THE AGRICULTURAL ADVISORY COMMITTEE.

A meeting of the Agricultural Advisory Committee of the Department of Agriculture, S.S. and F.M.S. was held at Kuala Lumpur on 14th March, 1934. The Hon'ble the Director of Agriculture was in the Chair. The following are among the more important subjects discussed.

The Coconut Industry.

A resolution for transmission to the Malayan Governments was drawn up as follows :—

" The Advisory Committee of the Department of Agriculture desires to draw the attention of the various Malayan Governments to the present precarious position of the coconut industry and that of other oil crops in this country.

" It considers that the outlook for these industries is extremely grave and it suggests that, especially in view of the large areas cultivated under these crops by small-holders, the matter must be one of serious concern to Government.

" The Committee suggests for the consideration of the Malayan Governments that a useful purpose would be served if His Excellency would appoint a Commission to make full enquiry into the circumstances of the coconut and other vegetable oil producing industries in Malaya with a view to reporting thereon to the Malayan Governments.

"The Committee desires to add that it has had represented to it that, apart from the general disabilities under which these industries are labouring owing to the world economic situation, the copra industry is in particular suffering from unfavourable discrimination by shipping companies in the matter of freight. It suggests that, in the interests of the industry in general and of the small-holders in particular, the position in this respect may be such as to call for special action if this is feasible." (See note on appointment of Committee to investigate Malayan Oil Producing Industries).

The Pineapple Industry.

The meeting was informed that the bill for establishing legislation in regard to the pineapple industry had passed its third reading in the Legislative Council and that steps are being taken to introduce similar legislation in Selangor and Johore. It was agreed that, in order to institute uniformity, legislation in the two latter States should include a clause, similar to that embodied in the S.S. Ordinance, for the establishment of an Advisory Committee which can assist in securing co-ordination in all the administrative areas concerned, and further, that the personnel of this Committee should be identical for these three areas.

The meeting was informed that draft rules and standards for grading canned pineapples has been drawn up and submitted for comments to the various representatives of the trade.

The Chairman reported that a first trial shipment of 88 cases of graded pineapples had been despatched from Singapore with the object of introducing officially graded fruit to the notice of the trade at home.

Report on Coffee Samples from Tanah Rata.

The Committee was informed that the latest report received showed a definite improvement on preceding reports on the samples sent to London and that it is hoped very shortly to better the conditions of manufacture by the addition of new machinery on Cameron Highlands.

Farm Schools at Malacca and Singapore.

The Chairman reported that the proposals for a Farm School at Malacca have been approved by the Resident Councillor, Malacca; they have been referred to the Malacca Committee of the Council and if they are finally agreed upon, the work will be proceeded with during the current year. He stated that similar proposals for the establishment of a school at Singapore had been provisionally approved by the Governor in Executive Council and would be proceeded with this year if the Legislative Council agreed to vote the money.

Mouldy Rot Disease of Rubber.

The Chairman reports that the scheme for distribution to kampong owners of cheap Izal for the treatment of mouldy rot is working very well in Selangor, Negri Sembilan, Pahang, Penang and Province Wellesley, Kedah and in parts

of Perak, and that arrangements are being made for its inception in other States and Settlements.

Among other subjects discussed at the meeting were :—poultry; tea experiments on Cameron Highlands; development of the rice industry; marketing of Malayan bananas; research work on copra; and home garden competitions.

COMMITTEE TO INVESTIGATE MALAYAN OIL-PRODUCING INDUSTRIES.

H. E. The High Commissioner has appointed a Committee consisting of The Hon'ble the Director of Agriculture (Chairman); The Hon'ble the Raja Muda of Perak, M.F.C.; The Director of Co-operation, F.M.S. and S.S.; Mr. J. C. Innes, Manager of the Penang Rubber Estates Co., Ltd., as the S.S. member; Y. M. Ungku Abdul Aziz bin Abdul Majid, as the representative of Johore and Mr. F. C. Cooke (Secretary) with the following terms of reference :—

> "To investigate and report on the present economic condition of the coconut and other vegetable oil producing industries in Malaya and to make recommendations."

AGRICULTURAL SHOWS, 1934.

Balik Pulau, Penang	March 30th. to April 1st.
Kota Bharu, Kelantan	April 19th.
Bukit Mertajam, Province Wellesley	April 20th. and 21st.
Teluk Anson, Perak	April 28th.
Temerloh, Pahang	May 19th.
Eleventh Malayan Exhibition, Kuala Lumpur	June 2nd. to 4th.
Kuala Selangor, Selangor	August 4th.

Agricultural Shows are also being arranged at the following centres on dates yet to be fixed :—Kajang, Sabak Bernam and Kuala Langat in Selangor, Bentong in Pahang (in August), Mersing in Johore (about June).

In addition to the above, Padi Shows will be held at 46 centres before the Malayan Exhibition, the winning exhibits of each being despatched to the latter Exhibition for further competition.

CORRECTION.

Reference to the article on "A Major Pest of *Derris*" published in the *Malayan Agricultural Journal*, Volume XVIII, No. 11, 1930.

The insect dealt with therein, provisionally determined as *Neolepta biplagiata* Jacoby, has since been described as a new species, the name being *Craniotectus corbetti* Laboissière.

The publication in which this species is described is the "Annales de l'Association des Naturalistes, Levallois-Perret, 20 (1914-31) 1932, pp. 140, 141.

Departmental.

FROM THE DISTRICTS.

The Weather.

April was a normally wet month in most parts of the Peninsula, with a rainfall about or rather above the average. At Cameron Highlands, however, the rainfall was very much in excess of the average for the past five years. In contrast to the generally prevailing conditions, the weather was unusually dry at Lumut in the Dindings, Sitiawan on the Perak coast, along the west coast in Malacca and Johore, and in Singapore island; while on the east coast of Johore and in the Pekan and Temerloh Districts of Pahang, the rainfall was below the average for the month.

Remarks on Crops.

Rubber.—Reports of an international agreement for the restriction of rubber production and their confirmation at the end of the month caused a further rise in prices. The lowest and highest prices in dollars and cents per picul recorded for rubber from small holdings were:—Smoked Sheet $19.20 to $25.50; Unsmoked Sheet $16 to $25; Scrap $4 to $12. The Singapore prices for these grades were $25.50, $23.50 and $9.50 as compared with $22, $20.50 and $7.50 in March. Penang prices for Unsmoked Sheet ranged from $20.50 to $24 as compared with $19 to $22.50 in March.

As was to be expected, the rise in price has resulted in bringing back into tapping almost all the holdings on which the trees are of tappable age. References are made to excessive tapping in some localities, while from Johore and eastern Pahang it is reported that tapping is often done by unskilled women and children with consequent damage to the trees. The use of ladders to give access to tappable bark has been observed in a number of instances in Negri Sembilan.

Leaf mildew on trees just recovering from wintering continued to be fairly widespread in the localities mentioned in last month's report, but was prevented from doing serious damage by the prevailing wet weather. Treatment of bark diseases, especially mouldy rot, continued to improve as also did the general upkeep of small holdings.

Padi.—The price of padi at the Government Rice Mill, Bagan Serai, remained at $1.40 per picul, while private buyers paid $1.20 to $1.30 per picul. The price in Kedah declined and was equivalent to approximately 90 cents to $1 per picul in Kota Star District, while in the Province the range was from about $1 to $1.35 per picul.

The padi harvest has been completed, except in the Sabak Bernam sub-District of Selangor and Kuantan District of Pahang, where reaping was in progress throughout the month. The Krian crop is the best obtained during

the last decade, being roughly estimated at 18 million gantangs. The Bagan Serai mill has already purchased some 12,000 tons of padi. The crops in Kedah and Province Wellesley are known to be very good. In Malacca some 32,250 acres planted yielded 12,360,000 gantangs of padi, a satisfactory feature being the small proportion of padi land left unplanted.

In the Panchang Bedina area in Sabak Bernam sub-District where controlled drainage is being provided, some 5,500 acres of new padi land were planted. Rats did extensive damage to 900 acres but the crop from the remaining 4,600 acres is expected to average 300 gantangs per acre.

In parts of Johore the work of preparing the land for planting was delayed by floods.

Coconuts and Copra.—The average price of copra declined a little further in most localities, ranging from $1 to $2.75 per picul, although a price of $3.50 is recorded from one locality in Kedah. The Singapore price was about $2.30 per picul.

In spite of the very low price, some further progress can be recorded in the preparation of improved copra. Four approved kilns have been completed and are now working in various parts of the Settlement of Penang. With the aid of Government, a kiln has been completed in the Muar District of Johore and a scheme for other Government-aided kilns to be run under the supervision of small local committees is under consideration. A mud-walled kiln at Kuala Pahang is being replaced by a brick kiln. Small-holders appear to be commencing to realise that, in the face of prevailing conditions, it is becoming increasingly necessary for them to prepare copra of good quality if their product is to remain saleable. In this connexion it may be mentioned that work is reported to have stopped on several primitive kilns in Selangor, though the improved kilns continue in use.

Pineapples.—As was anticipated, the supply of fruits increased considerably during the month and the canning factories were kept busy. Prices for fresh fruit in Johore were :—first quality $2, second quality $1.30 and third quality $0.80 per hundred. Corresponding prices in Singapore were $2.60 and $1.40 per hundred.

In the Pontian and Kukub areas of Johore, all available land is being planted up with suckers. The first crop of fruit from the Mandai area in Singapore was being harvested.

A meeting of the representatives of the Pineapple Industry with the Director of Agriculture in Singapore on April 17th. resulted in considerable progress towards the adoption of a grading scheme and the establishment of grading standards for canned pineapples.

Fruit.—In Malacca, mangoes and chikus made their appearance in the markets. Light crops of mangoes, oranges and jambu were obtained in western Pahang and good crops of mangoes and jambu in Johore.

During the month, a further consignment of fresh limes was exported to England from Singapore, the fruit being specially sorted and packed.

Tobacco.—Prices of sun-dried leaves have ranged from $7 to $36 per picul according to quality in most parts of the country, thus showing little change; they remained high at $15 to $60 per picul in Johore. In Malacca a further rise, giving a range of $25 to $40 per picul, has aroused renewed interest in this crop. In Kedah, planting has been commenced with the advent of rainy weather and in the Baling District some 52 acres have been planted.

Cigar leaf, cured about two years ago at the Pineapple Experiment Station in Singapore for a private grower, was kept to mature and sold in April. It had changed considerably in colour, texture and aroma and appeared to be excellent leaf. Reports on its quality were favourable and it sold for $65 per picul.

Agricultural Stations.

Work on the planting programmes for annual and permanent crops and other routine operations were continued under favourable conditions throughout the month.

The establishment of the Agricultural Station in Labuan has been commenced and good progress has been made in the development of the Kilanas Station in Brunei.

At Selama Station slime diseases destroyed most of the young tobacco and and at the Pineapple Station in Singapore the tobacco crop was severely damaged by stem borers.

At the Tanah Rata Station, Cameron Highlands, a big crop of tea leaf was obtained. The second consignment consisting of 68 half chests containing 4,368 lbs. of tea from this Station was sold in London during the month at an average price of 1/1.75 per lb. This compares with 1/1.35 per lb. received for the first consignment which comprised 111 half chests containing 6,976 lbs. sold in London in November, 1933.

The etiolated shoot method of propagation has so far given rooted shoots of limes, Mandarin oranges and rambutans at the Bukit Mertajam and Selama Stations.

Padi Stations and Test Plots.

A new Caterpillar tractor was received and successfully used for stumping and ploughing on the additional 30 acres of land for experiments in the mechanical cultivation of rice at the Pulau Gadong Station in Malacca.

Nurseries were sown and the land was prepared for planting at six Test Plots in Selangor, Negri Sembilan and Pahang.

The inter-season crop of vegetables at Bukit Merah Station made satisfactory progress, but at the Kendong Test Plot vegetable trials gave little promise of success.

Two new beds of mushrooms at Bukit Merah Station in Province Wellesley fruited as also did another prepared for the Show at Balik Pulau in Penang.

Rural Lecture Caravan.

The Caravan toured Malacca from April the 4th. to 26th. Poultry husbandry and the preparation of improved copra formed the subjects of lectures and demonstrations.

Holiday Course.

A holiday course for boys from the Bukit Mertajam High School was commenced at the Bukit Mertajam Agricultural Station on April 24th. This course which was conducted by the Agricultural Field Officer, Province Wellesley and Penang, lasted eleven days and was attended by 14 boys. Work was confined to the mornings and attendance was purely voluntary. The early part of the morning was allotted to practical work and this was followed by a lecture. The subjects dealt with comprised planting operations, propagation by seed and by vegetative methods, rotation of crops and practical methods of control of pests and diseases of crops. An officer of the Rubber Research Institute of Malaya gave a most useful demonstration of budding rubber in connexion with vegetative methods of propagation. After a lecture on rat destruction, the boys took part in a rat hunt. They were also shown mushroom cultivation and given a demonstration of the construction and use of a copra kiln of approved pattern. The course is considered to have been a success to which the assistance rendered by the Head Master of the Bukit Mertajam High School did much to contribute.

Agricultural Shows and Malayan Padi Competition.

A successful Show organised by the District Economic Board under the Chairmanship of the District Officer, Province Wellesley, was held at Bukit Mertajam on April 20th. and 21st. in the hall of the High School. The first stage of the Malayan Padi Competition was conducted at this Show at which the winning exhibits for despatch to the Kuala Lumpur Show were selected.

The Department of Agriculture staged an exhibit which comprised :— samples of padi illustrating the qualities required for the Malayan Padi Competition, mushroom cultivation, and rat destruction. The Health Department also provided a series of exhibits devoted to rural hygiene.

This was the first Show held in the Province. The quality of the exhibits was good and much local interest was aroused.

A short account of the Agricultural Show at Balik Pulau Penang, will be found elsewhere in this number.

Local competitions in connexion with the Malayan Padi Competition were held in many parts of the country.

DEPARTMENTAL NOTES.

Presentation of Prizes, School of Agriculture.

The distribution of prizes and diplomas to students on the completion of their three years' course of training took place at the School of Agriculture, Malaya, on 19th. April, 1934, the awards being kindly distributed by The Hon'ble Mr. T. S. Adams, British Resident, Selangor.

The Principal of the School, The Hon'ble Dr. H. A. Tempany, C.B.E., in his opening speech welcomed the British Resident and made reference to the Resident's keen interest in and sympathy with, all attempts to broaden and stabilise the basis of Malayan agriculture.

He outlined the history of the School and recalled the difficult times through which the School had successfully passed. In conclusion he paid a tribute to the efforts of the Staff and the keenness of the students.

Mr. G. E. Mann, M.C., Vice-Principal, reviewed the school activities for the past year. He remarked that the change over in the curriculum from a three year to a two year basis for the major course appeared to be justifying itself and pointed out that it had been possible to extend the practical side of the curriculum.

After referring to the keenness and efficiency of the Malayan Volunteer Infantry platoon under the command of Mr. Dawson, he alluded to the activities of the School on the playing field.

The British Resident then distributed the prizes, after which he addressed the students, reminding them of the important part many of them were destined to take in bridging the gap between the research scientist and the raiat. The Asiatic field staff would not find their duties light; it would call not only for technical knowledge, but ability to convert such knowledge into simple language, to back it up by demonstration, and to present it with sympathy and tact. In conclusion, he complimented the School on its successes. His final good wishes to the departing students carried with them the advice not to regard the end of their school life as the end of their education, but rather as the beginning of a somewhat wider type of education.

Tour of the Director of Agriculture.

The Director of Agriculture paid an official visit to Malacca and Singapore between April 13th. and April 18th. On April 14th. he inspected the Stations at Pulau Gadong and Sungei Udang, addressed the Annual General Meeting of the Malacca Planters' Association, conferred with The Hon'ble Resident Councillor and the Agricultural Field Officer. In the evening he attended a demonstration by the Rural Lecture Caravan which was touring the Settlement at the time.

On April 15th. he proceeded to Singapore via Johore, conferring with the Agricultural Officers *en route*.

On April 16th. he conferred with the Agricultural Field Officer, Singapore and with others concerning various questions, and in the afternoon he attended a Conference with the Registrar-General of Statistics.

On April 17th. he visited the Singapore Dairy Farm and the Mandai district. In the afternoon he attended a conference of pineapple packers and exporters at the Singapore Chamber of Commerce, relative to the introduction of grading in the pineapple industry.

He returned to Kuala Lumpur on the 19th. April.

Tours.

Mr. F. C. Cooke, Officer-in-Charge, Copra Investigations, visited the West Coast of Johore, at the invitation of the Johore Government, between 10th. and 15th. April, for the purpose of discussing with officers concerned, proposals for the development of copra manufacture by small-holders and to inspect demonstration kilns under construction.

Transfers.

Mr. W. G. Higgins, Assistant to Statistician, has been transferred temporarily, to the Field Branch, from April 26th., 1934, on which date he proceeded to Kuala Kangsar to act as Agricultural Field Officer, Perak Central.

Mr. J. A. Craig, Principal Agricultural Officer, Kelantan, has been transferred to the School of Agriculture, Malaya, to act as Vice-Principal of the School during the absence on leave of Mr. G. E. Mann.

Mr. N. H. Sands, Acting Agricultural Field Officer, Perak Central, has been transferred to Kelantan, where he will act as Principal Agricultural Officer, during the absence from the State of Mr. J. A. Craig.

Leave.

Mr. G. E. Mann, M.C., Vice-Principal, School of Agriculture, Malaya, has been granted 9 months and 24 days leave on full pay from 27th. April, 1934, to 19th. February, 1935, inclusive.

Mr. R. G. H. Wilshaw, Agricultural Field Officer, returned from leave on April 24th., 1934.

Statistical

MARKET PRICES

April 1934.

Rubber.—The market price of rubber steadily increased during the month, opening at 17⅜ cents per lb. for spot loose in Singapore and closing at 21½ cents per lb. The higher price was caused by the expectation of the early introduction of a measure of restriction of production or exports. The average price for the month in Singapore was 18.75 cents per lb., as compared with 17.18 cents per lb. in March. The average price in April in London was 5.65d. per lb., and 11.94 cents gold per lb. in New York, as compared with 5.18d. in London and 10.87 cents gold in New York in March.

Weekly prices during April for small-holders' rubber at Kuala Pilah, Negri Sembilan; Kuala Kangsar, Perak and Batu Pahat, Johore, were as shewn in Table II.

Palm Oil.—The course of the market is shewn in the following table. Basis 5 per cent. f.f.a.

Table I.

DATE	PALM OIL			KERNELS
	L'Pool/Holland/ Hamburg c. i. f. landed weights in bulk per ton £. s. d.	U.S.A. landed weight per lb. c. i. f. New York/ Philadelphia cents gold	L'Pool/Continent c. i. f. per ton net in barrels £. s. d.	Fair Average Malayan Quality c. i. f. Landed Weight per ton on Continent. £. s. d.
April 4	12 15 0	2.45	10 10 0	6 2 6
,, 11	13 10 0	2.45	11 0 0	6 5 0
,, 18	12 15 0	2.30	10 10 0	6 5 0
,, 25	12 15 0	2.30	10 10 0	6 5 0

Copra.—The price of Sundried copra in Singapore remained steady during April, between $2.55 and $2.65 per picul, the average price for this grade being $2.62 per picul as compared with $2.90 per picul in March. The mixed quality averaged $2.15 per picul as compared with $2.31 in March.

Copra cake was quoted throughout the month at $1 per picul.

Rice.—The average wholesale price of Siam No. 2 ordinary rice per picul in Singapore in March was $2.82 as compared with $3.06 per picul in February. No. 1 Rangoon rice averaged $2.47 per picul in March as compared with $2.50

Table II.

Grades	VALUE PER PICUL (dollars)														
	Kuala Pilah, Negri Sembilan.							Kuala Kangsar, Perak.				Batu Pahat Johore.			
	8.3.34	22.3.34	29.3.34	5.4.34	12.4.34	19.4.34	26.4.34	4.4.34	11.4.34	18.4.34	25.4.34	4.4.34	11.4.34	18.4.34	25.4.34
Smoked sheet	20.44	20.30	21.40	22.06	22.17		24.39					21.50	21.27	22.66	23.26
Unsmoked sheet	17.66	19.39	18.67	19.48	15.33	20.77	21.55					†18.00			
Rubber*								2.180	20.57	20.53	22.73		6.80	7.06	
Scrap	6.88	†5.30	6.00	8.96	8.15	8.00	11.84								

† Very small purchase.

* Wet unsmoked sheet.

Transport by lorry Kuala Pilah to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8.00 per ton.

Transport from Batu Pahat to Singapore by lorry excluding duty, 90 cents per picul.

Transport from Kuala Kangsar to Prai by railway $6.20 per ton.

Transport from Kuala Kangsar to Singapore by railway $10.00 per ton (minimum consignment 5 tons).

At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.

At Kuala Kangsar the standard deduction for moisture in unsmoked sheet is 10 per cent.

per picul in February and Saigon No. 1 (long grain) $2.62 in March as compared with $2.60 in February. Corresponding prices in March 1933 were $3.40, $3.05 and $3.32 respectively.

The average retail market prices in cents per gantang of No. 2 Siam rice in March were :—Singapore 23, Penang 26, Malacca 24, as compared with 22, 26, 24 respectively in February and 23, 28, 24 in January.

The average declared trade value of imports of rice in March was $3.11 per picul, as compared with $3.20 per picul in February and $3.30 per picul in January 1934.

Tea.—During March, the London price quoted for Malayan tea was 1s.1d. per lb. Average London prices per lb. during March for tea consignments from other countries were as follows :—Ceylon 1s.3.08d.; Java 1s.0.41d.; Indian Northern 1s.2.14d.; Indian Southern 1s.2.29d.; Sumatra 11.83d.

The London market has been weaker, and although the demand has been good, prices shewed a downward tendency throughout the month.

Tuba Root.—There is a considerable difference between sellers' ideas of prices and those of buyers. In consequence, little fresh business has been transacted. Sold on rotenone-content basis prices have averaged $32.50 per picul, while roots sold on ether extract basis averaged $26 per picul during April.

Coffee.—The Singapore price of coffee shewed a slight upward trend during April : the average price for the month was $20.69 per picul. Palembang coffee rose from $15.25 to $15.75, the average price being $15.62 as compared with $16.20 in March.

Arecanuts.—Supplies of the various grades, with the exception of Bila Whole, are now available. Average prices per picul in Singapore during April were : Splits $2.65 to $4.27; Sliced $7 to $10.95; Red Whole $2.75 to $3.85; Sourabaya Whole, $4.34 to $5.75; Kelantan $3.50 to $3.96, the prices within these ranges depending upon quality.

Gambier.—Block gambier declined 25 cents per picul to $3.75 per picul, the average price for the month being $3.81 as compared with $4.19 in March. Cube No. 1 remained firm at $6.75 as compared with an average price of $6.69 per picul in March.

Pineapples.—Values hardened somewhat towards the end of the month. The London market will not pay the prices demanded by sellers in Singapore. Average Singapore prices per case in April were :—Cubes $3.04, Sliced Flat $2.93, Sliced Tall $3.02, as compared with $3.12, $2.98 and $3.06 respectively in March.

Tapioca.—The Singapore market was dull during the first half of the month, but in the latter part of the month prices were steady at the recent low levels, with more enquiry at the end of the month. Average prices per picul in April were :—Flake Fair $4.19, Pearl Seed $5.39, Pearl Medium $6, as compared with $4.70, $5.80 and $6.38 in March.

Sago.—The trend of the Singapore market was similar to that for tapioca. Average prices per picul in April were :—Pearl—Small Fair $3.74, Flour, Sarawak Fair $1.81 as compared with $3.76 and $1.87 respectively in the previous month.

Mace.—In the latter half of the month, Singapore prices firmed; nominal prices are higher, but sellers will reduce for firm business. Average prices per picul in April were :—Siouw $67.50, Amboina $45, as compared with $65 and $40 respectively in March.

Nutmegs.—The Singapore price for 110's was steady during April at $22.50 per picul, while 80's declined to $23 per picul; the average prices per picul being $23.50. Corresponding average prices in March were $24.25 and $26.75.

Pepper.—Prices in Europe tend to harden, in consequence of which prices improved in Singapore towards the end of the month. Average Singapore prices per picul in April were :—Singapore Black $15.25; Singapore White $29.62; Muntok White $30.12 as compared with $15.69, $29.88 and $30.75 in March.

Cloves.—Prices continued steady and nominal at $35 per picul for Zanzibar $45 per picul for Amboina.

The above prices are based on London and Singapore daily quotations for rubber; on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm oil reports are kindly supplied by Messrs. Guthrie & Co. Ltd., Kuala Lumpur; the Singapore prices for coffee and arecanuts by the Lianqui Trading Company of Singapore, and tuba prices by Messrs. Mackay & Co., Singapore.

1 picul = 133⅓ lbs. The Dollar is fixed at two shillings and four pence.

Note.—The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57, Charing Cross, London, S.W.1.

GENERAL RICE SUMMARY. *

March, 1934

Malaya.—The imports of foreign rice into Malaya during March were 52,693 tons and exports during the month 10,332 tons. The net imports for the first quarter 1934 were 109,263 tons as compared with 98,448 tons in the corresponding period of 1933, an increase of 11 per cent.

Of the imports during March, 53 per cent. were consigned to Singapore, 15 per cent. to Penang, 4 per cent. to Malacca, 19 per cent. to the Federated Malay States and 9 per cent. to the Unfederated Malay States. Of the total 68 per cent. came from Siam, 28 per cent. from Burma, 3 per cent. from French Indo-China and 1 per cent. from other countries. Of the exports during March 70 per cent. were shipped to Netherlands India and 30 per cent. to other countries.

The various kinds of rice exported were :—Siam 6,358 tons (62 per cent.), Burma 3,335 tons (32 per cent.), Indo-China 263 tons (3 per cent.), Local production 345 tons (3 per cent.) and India 31 tons.

India and Burma.—Foreign exports in February were 122,000 tons as compared with 77,000 tons in January, and with 68,000 tons in January 1933 and 174,000 tons in February 1933.

The total exports of rice and bran from Burma for the period 1 January to 3 March 1934 amounted to 528,728 metric tons as compared with 505,828 metric tons for the corresponding period of 1933, an increase of 4.5 per cent.

Japan.—Latest information available published in the Summary for February 1934.

Siam.—The third and final forecast received from the Department of Commerce, Ministry of Economic Affairs, Bangkok, dated 3rd. April 1934 states that the area planted as at the end of January amounted to 8,100,000 acres, an increase of 100,000 acres as compared with the previous estimate. The area damaged was approximately 600,000 acres. The total outturn was estimated at 3,054,925 tons (rice) and the surplus available for export at 1,440,325 tons (rice).

French Indo-China.—Entries of padi into Cholon January to March amounted to 326,000 tons, this being the same figure as for the corresponding period of 1933. Exports of rice January to March 1934 were 341,000 tons as compared with 362,000 tons for the corresponding period of 1933, a decrease in 1934 of 5.8 per cent.

A report on the Saigon Rice Market for March 1934 states that the market for padi was active in March with a continued decline in prices. Arrivals from the interior have been normal for the time of the year.

Rice prices fell gradually, and during the second half of the month, France remained the only important buyer. From $3 (Saigon) on 1st. March, the price of No. 1 rice fell to $2.86 (Saigon) per 100 kilogrammes at the end of the month. Brokens :—Market firm as a result of poor stocks.

* Abridged from the Rice Summary for March 1934, compiled by the Department of Statistics, S.S. and F.M.S.

Netherlands India.—Imports of rice in January were 10,822 metric tons, as compared with 35,890 metric tons in January 1933, a decrease of 69.8 per cent. Of these imports 8,804 metric tons were into the Outer Provinces and 2,018 metric tons into Java and Madura.

Ceylon.—Imports for January and February 1934 were 82,674 tons as compared with 71,252 tons during the corresponding period of 1933, an increase of 16 per cent. Of these imports, 15 per cent. were from British India, 70 per cent. from Burma and 15 per cent. from other countries.

Europe and America.—Quantities of rice shipped from the East were :—

(*a*) To Europe : for the period 1st. January to 22nd. March, 170,277 tons as compared with 280,966 tons for the corresponding period of 1933, a decrease of 39 per cent. Of these shipments 26 per cent. were from Burma, nil from Japan, 53 per cent. from Saigon, 61 per cent. from Siam and 5 per cent. from Bengal as compared with the following percentages 39, 8, 44, 8 and 1 respectively in 1933.

(*b*) To The Levant : 1st. January to 28th. February, 1934, 5,327 tons as compared with 4,560 tons for the same period in 1933, an increase of 16.8 per cent.

(*c*) To The West India and America : 1st. January to 28th. February, 11,852 tons as compared with 17,218 tons during the corresponding period of 1933, a decrease of 31.2 per cent.

MALAYAN AGRICULTURAL EXPORTS, MARCH, 1934.

PRODUCT.	Net Export in Tons.				
	Year 1933.	Jan.-Mar. 1933.	Jan.-Mar. 1934.	March 1933.	March 1934.
Arecanuts ...	20,756	5,506	9,749	973	2,035
Coconuts, fresh ...	100,609†	21,609†	21,652†	5,455†	7,108†
Coconut oil ...	17,568	4,636	6,251	1,676	2,384
Copra ...	110,543	20,902	27,499	1,911	10,445
Gambier, all kinds ...	2,560	593	559	199	231
Palm kernels ...	1,983	353	497	154	151
Palm oil ...	12,101	1,102	2,244	540	580
Pineapples canned ...	59,582	12,935	14,289	3,910	5,457
Rubber ...	459,836§	99,304§	124,161§	31,917§	40,751§
Sago,—flour ...	7,648	1,481	3,469	112	2,381
„ —pearl ...	2,646	505	766	157	291
„ —raw ...	4,420*	1,078*	1,080*	361*	312*
Tapioca,—flake ...	9,881	3,055	2,172	1,141	993
„ —flour ...	702*	36	532*	328*	319*
„ —pearl ...	17,297	3,465	3,775	1,047	1,442
Tuba root ...	569½	80	150½	37	44

† hundreds in number. * net imports. § production.

MALAYAN PRODUCTION IN TONS OF PALM OIL AND KERNELS 1st. QUARTER, 1934.

(As declared by Estates).

	Palm Oil		Palm Kernels	
	F.M.S.	Johore.	F.M.S.	Johore.
1934 January ...	926.0	166.3	152.9	30.8
February ...	849.7	129.9	131.6	27.3
March ...	1046.1	220.6	183.0	42.7
TOTAL ...	2821.8	516.8	467.5	100.8

MALAYA RUBBER STATISTICS

ACREAGES OF TAPPABLE RUBBER NOT TAPPED ON ESTATES OF 100 ACRES AND OVER, FOR THE MONTH ENDING MARCH, 1934.

STATE OR TERRITORY	Acreage of Tappable Rubber end 1932 (d)	ESTATES WHICH HAVE ENTIRELY CEASED TAPPING		ESTATES WHICH HAVE PARTLY CEASED TAPPING		AREA OF TAPPABLE RUBBER NEVER BEEN TAPPED		Total (3) + (5)	Percentage of (9) to (2)
		Acreage	Percentage of (3) to (2)	Acreage	Percentage of (5) to (2)	Acreage	Percentage of (7) to (2)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
STRAITS SETTLEMENTS :—									
Province Wellesley	44,734	1,323	2.9	7,430	16.6	1,054	2.4	8,753	19.6
Dindings	6,,969	209	3.0	849	12.1	536	7.7	1,058	15.2
Malacca	111,780	4,619	4.1	15,232	13.6	5,582	5.0	19,851	17.7
Penang Island	1,635	623	38.1	176	10.7	177	10.8	799	48.9
Singapore Island	28,269	5,346	18.9	4,764	16.8	566	2.0	10,110	35.8
Total S.S. ...	193,387	12,120	6.2	28,451	14.7	7,915	4.1	40,571	21.0
FEDERATED MALAY STATES :—									
Perak	250,951	3,786	1.5	27,987	11.1	14,426	5.8	31,773	12.7
Selangor	308,379	1,106	0.4	36,424	11.8	13,441	4.3	37,530	12.2
Negri Sembilan	228,541	5,125	2.2	22,061	9.6	16,407	7.2	27,186	11.9
Pahang	38,141	4,819	12.6	3,677	9.6	6,396	16.8	8,496	22.3
Total F.M.S. ...	826,012	14,836	1.8	90,149	10.9	50,670	6.1	104,985	12.7
UNFEDERATED MALAY STATES :—									
Johore	325,747	15,549	4.8	31,882	9.8	21,293	6.5	47,431	14.5
Kedah (a) (b)	126,588	3,595	2.8	9,556	7.6	(e) 5,700	4.5	13,151	10.4
Kelantan	21,176	2,080	9.8	2,294	10.8	3,591	16.9	4,374	20.6
Trengganu (c)	4,643	Nil	Nil	1,609	34.6	200	4.3	1,609	34.7
Perlis (a) (b)	957	106	11.1	131	13.7	308	32.2	237	24.7
Total U.M.S. ...	479,111	21,330	4.4	45,472	9.5	31,092	6.5	66,802	13.9
TOTAL MALAYA ...	1,498,510	48,286	3.2	164,072	10.9	89,677	6.0	212,358	14.2

Notes :—(*a*) Registered companies only and are rendered quarterly.

(*b*) The figures quoted for Kedah and Perlis are those for end December 1933, and Kelantan end January, 1934 Revised figures will be published when available.

(*c*) Registered Companies only.

(*d*) Figures for end December 1933, are not yet available.

(*e*) Estimated : figures not yet available.

FOR THE MONTH OF MARCH, 1934 IN DRY TONS.

State or Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres estimated 2		Imports				Exports including re-exports				Stocks at end of month		
								during the month		January to Mar. inclusive 1934		during the month		January to Mar. inclusive 1934				
	Ports	Dealers	Estates of 100 acres and over	during the month	January to March inclusive 1934	during the month	January to March inclusive 1934	Foreign	From Malay States & Labuan	Foreign	From Malay States & Labuan	Foreign	Local	Foreign	Local	Ports	Dealers	Estates of 100 acres and over
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
MALAY STATES :—																		
Federated Malay States ...	...	15,490	11,345	11,231	34,735	11,551	32,492	Nil	Nil	Nil	Nil	16,530	6,916	48,361	18,105	...	16,339	9,813
Johore ...	...	3,935	3,294	3,492	10,765	4,178	13,909	Nil	3	Nil	13	1,565	6,879	4,774	19,942	...	3,404	3,054
Kedah ...	...	384	2,352	2,518	8,410	1,447	5,046	Nil	Nil	Nil	Nil	1,660	2,896	4,559	9,584	...	323	1,822
Perlis ...	...	22	15	14	43	41	109	Nil	Nil	Nil	Nil	Nil	64	Nil	167	...	14	14
Kelantan ...	...	382	261	181	665	1,236	2,722	Nil	Nil	319	Nil	114	1,269	260	3,187	...	553	124
Trengganu ...	...	55	50	221	619	111	308	Nil	Nil	Nil	Nil	Nil	332	Nil	927		55	50
Total Malay States	...	20,268	17,317	17,657	55,237	18,564	54,586	Nil	3	319	13	19,869	18,356	57,954	51,912	...	20,688	14,877
STRAITS SETTLEMENTS :-																		
Malacca ...	...	3,427	1,182	1,312	4,010			1		2		3,170		10,692		...	3,812	992
Province Wellesley	...	926	543	477	1,632			Nil		Nil						...	1,871	435
Dindings ...	...	58	152	107	326	2,451	7,823	Nil	16,375	Nil	49,655	8,308	Nil	25,354	Nil	...	74	133
Penang ...	3,116	5,877	9	8	37			2,412		6,089						1,090	6,928	6
Singapore ...	4,961	34,215	159	175	510			17,494		44,652		27,168		77,437		6,841	38,608	144
Total Straits Settlements	8,077	44,503	2,045	2,079	6,515	2,451	7,823	19,907	16,375	50,743	49,655	38,646	Nil	113,483	Nil	7,931	51,293	1,710
TOTAL MALAYA	8,077	64,771	19,362	19,736	61,752	21,015	62,409	19,907	16,378	51,062	49,668	58,515	18,356	171,437	51,912	7,931	71,981	16,587

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca.	Johore	Kedah
20	21	22	23	24	25	26
DRY RUBBER	12,207	31,838	5,955	4,587	1,569	100
WET RUBBER	4,132	6,770	973	1,170	1,835	223
TOTAL ...	16,339	38,608	6,928	5,757	3,404	323

TABLE III
FOREIGN EXPORTS

PORTS	For month	January to March 1934
Singapore ...	37,918	109,537
Penang ...	13,535	40,291
Port Swettenham.	6,215	19,245
Malacca ...	847	2,364
MALAYA ...	58,515	171,437

TABLE IV
DOMESTIC EXPORTS 4

AREA	For month	January to March 1934
Malay States ...	41,048	123,444
Straits Settlements		
MALAYA ...	41,048	123,444

Notes :—1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained.

2. The production of estates of less than 100 acres is estimated from the formula : Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month. + Consumption, *i.e.*, Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [20] —[2]—[3]—[4]—[5]—[9]—[10]. For the Straits Settlements, Columns [7] and [8] represent purchases by dealers from local estates of less than 100 acres, reduced by 15 % to terms of dry rubber.

3. Foreign imports as published in Return I. & E. 5, wet imports being reduced to dry weight by 25% except those from Netherlands Indía which are reduced by the official percentages shown in Schedule I.

4. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15;% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.

5 Domestic exports are estimated by deducting the average monthly dry weight of foreign imports over a period of 2 months from the gross foreign exports of the later month, the foreign exports of the Malay States being domestic production.

6. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S.S. and F.M.S., at Singapore on 25th April, 1934.

METEOROLOGICAL SUMMARY, MALAYA, MARCH, 1934.

Locality	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine		
	Means of			Absolute Extremes						Total		Most in a day	Number of days					Total	Daily Mean	Per cent
	A. Max.	B. Min.	Mean of A and B	Highest Max.	Lowest Min.	Lowest Max.	Highest Min.	At 1 foot	At 4 feet			Amt.	Precipitation .01 in or more	Precipitation, .04 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more			
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.								
Railway Hill, Kuala Lumpur, Selangor ...	90.6	71.3	80.9	95	68	84	74	83.4	84.1	13.98	355.1	4.25	25	22	7	5		157.00	5.06	42
Bukit Jeram, Selangor ...	87.4	71.8	79.6	91	69	84	75	83.5	85.0	10.34	262.6	1.40	23	19	5			184.55	5.95	49
Sitiawan, Perak ...	88.5	72.4	80.5	93	70	85	75	83.1	83.8	14.13	358.9	2.82	16	13	3	1		193.80	6.25	52
Temerloh, Pahang ...	87.2	71.9	79.5	93	69	79	75	83.0	84.0	7.89	200.4	1.82	19	18		1		156.95	5.06	42
Kuala Lipis, Pahang ...	86.7	71.4	79.1	92	69	78	74	82.5	82.7	7.13	181.1	2.12	20	16	1	15		138.85	4.48	37
Kuala Pahang, Pahang ...	83.9	73.8	78.9	89	71	78	78	82.4	82.5	11.04	280.4	2.56	18	14	1		1	189.15	6.10	50
Mount Faber, Singapore ...	85.5	71.8	78.7	90	69	73	75	79.4	80.1	10.65	270.5	4.38	22	15	3	1	2	159.70	5.15	43
Butterworth, Province Wellesley ...	88.0	72.6	80.3	91	70	84	75	83.7	84.5	7.62	193.6	2.00	15	14	4			208.95	6.74	56
Bukit China. Malacca ...	84.6	72.8	78.7	89	69	76	76	81.2	82.0	11.74	298.2	5.85	18	13	1		2	156.25	5.04	42
Kluang, Johore ...	86.2	71.2	78.7	92	68	75	74	80.1	80.2	15.62	396.8	7.31	21	16		4		155.35	5.01	41
Bukit Lalang, Mersing, Johore	83.5	72.4	77.9	90	70	79	75	79.9	79.5	9.21	233.9	1.25	17	15	1	2	2	187.80	6.06	50
Alor Star, Kedah ...	90.8	71.5	81.1	93	69	87	73	84.0	84.0	2.95	74.9	1.20	16	10	13	3		228.65	7.38	61
Kota Bahru, Kelantan ...	86.4	72.7	79.5	91	70	80	77	81.9	82.4	3.07	78.0	0.86	13	10				199.30	6.43	52
Kuala Trengganu, Trengganu	85.0	72.5	78.7	89	69	79	76	81.2	81.7	3.87	98.3	1.33	13	11		3	1	197.40	6.37	53
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft. Pahang ...	71.6	61.6	66.6	79	60	63	64	69.9	70.1	12.80	325.1	2.88	22	19	1	14	1	105.65	3.41	28
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	71.2	56.2	63.7	76	51	65	61	68.1	68.2	13.27	337.1	2.05	20	20	1	1	1	103.25	3.33	27
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ..	70.2	58.8	64.5	75	57	65	61			13.78	350.00	2.45	25	22		1	1	114.60	3.70	30

Compiled from Returns supplied by the Meteorological Branch, Malaya